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Predictors of psychological therapy treatment outcome for anorexia nervosa: a systematic review

and

Evaluation of the reliability and validity of the English version of the schema mode inventory for eating disorders-short form for adults with dysfunctional eating behaviour

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Acknowledgments

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~"Surround yourself with the dreamers and the doers, the believers and the thinkers, but most of all, surround yourself with those who see the greatness within you, even when you don't see it yourself"~ -Edmund Lee

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Research Portfolio Abstract

Background/Aims: Eating disorders (EDs) are considered one of the most difficult and serious psychiatric illnesses to treat, due to high levels of complexity, chronicity and comorbidity. Anorexia nervosa (AN) is particularly resistant to treatment, with the majority of studies reporting high attrition rates and limited treatment success. Gaining a better understanding of treatment outcome predictors in AN will facilitate fine-tuning of current evidence-based treatments, potentially leading to better outcomes. One predictor of ED outcomes is high levels of comorbidity, especially rigid personality traits, Cluster C personality disorders and entrenched core beliefs (early maladaptive schemas). There is good evidence that psychological problems in adulthood are associated with patterns of thinking and feeling that begin in response to a complex interplay of temperament and early life experiences. We call these patterns of thinking and feeling 'core beliefs' or 'schemas'. Higher levels of early maladaptive schemas (EMS) and schema modes have been found in people with EDs. Understanding the schemas and mode states relevant to EDs is important in order to facilitate case conceptualisation, which takes account of personality/trait-based complexity and comorbidity alongside ED symptoms. The 190-item Schema Mode Inventory for eating disorders (SMI-ED) was adapted from the original SMI, in order to fine-tune measurement of EMS/modes in the ED population. A shortened version of the SMI-ED (SMI-ED-SF) was developed for regular clinical use and has been validated on an Italian ED population. This thesis consists of two studies: a systematic review (Journal Article 1) and an empirical study (Journal Article 2). The systematic review investigated the predictors of both dropout and outcome in outpatient

psychological therapy for AN. The empirical study explored the psychometric properties of the English version of the SMI-ED-SF and tested how well this new, shorter measure performs. Relationships between schema modes, ED symptoms, personality traits and childhood emotional neglect were explored in this process.

Methods: In Journal Article 1, a systematic search of three electronic databases, a quality assessment of included studies and a subsequent narrative synthesis were conducted. In Journal Article 2, 655 adults aged 16 and over who had ED symptomatology, alongside healthy adults were recruited from clinical services and through advertisements placed on social media and various local and international not-for-profit eating disorder organisations and support groups. Participants completed relevant psychological measures via the 'Jisc Online Survey' tool (historically run by Joint Information Systems Committee). The survey included the SMI-ED-SF, followed by re-testing two months later. The psychometric properties of this new measure were explored using correlational and hierarchical regression analyses.

Results: In Journal Article 1, 16 studies consisting of 11 trials were reviewed using a quality criteria tool. Several psychological predictors (e.g. longer duration of illness, poor body image, emotional avoidance, employment status, age, higher anxiety, OCD symptoms) of outpatient psychological therapy outcome (e.g. ED/mental health symptoms, weight change) were identified at the end of treatment and follow-up. Predictors of dropout were also identified. In Journal Article 2, the SMI-ED-SF showed adequate concurrent, convergent, discriminant and incremental validity, and good test-retest reliability. It also showed that specific schema modes are significantly

linked to ED behaviours and personality traits. In addition, it showed ED severity can be predicted by personality, childhood neglect and schema modes.

Conclusions: Overall, taken together, the two studies provide evidence of how complex EDs are to treat, and that many factors must be taken into account. The systematic review showed that there was little consistency between the studies with regard to methodologies and measures used, and the way results were reported, which partly explained why consistent predictors were sometimes not identified. However, it showed how many factors need to be taken into consideration when treating AN. The empirical study tested the psychometric properties of the SMI-ED-SF which has broadened its utility for both research and clinical settings. The findings represent a step forward in developing an easy-to-use psychometrically sound instrument to identify and explore mechanisms through which schema modes can be expressed by those with EDs. Developing a more precise measure of mode states within an ED population will enhance therapeutic case conceptualisation and treatment planning. This study also showed that schema modes are significantly correlated with specific ED behaviours and personality traits. To enhance the effectiveness of treatment and reduce risk of relapse, ED sufferers with schema-level beliefs may require a treatment model that specifically addresses both eating and personality pathology, as well as childhood trauma. The new SMI-ED-SF offers patients a tool to quickly and easily begin to explore the early origins of underlying schema level representations that will increase their chances of success in therapy.

Word count: 22,472 (excluding abstracts, references and appendices)

Lay Summary

Eating disorders (EDs) are considered one of the most difficult and serious psychiatric illnesses to treat, due to high levels of complexity, chronicity and comorbidity. Anorexia nervosa (AN) has particularly low recovery rates and high risk of relapse after treatment. A systematic review of the literature was carried out to further our knowledge about treatment predictors in AN in order to facilitate a better understanding of ways to improve and expand on current evidence-based treatments, potentially leading to better outcomes. Several psychological predictors (e.g. longer duration of illness, poor body image, emotional avoidance, employment status, age, higher anxiety, OCD symptoms) of outpatient psychological therapy outcome (e.g. ED/mental health symptoms, weight change) were identified at the end of treatment and follow-up. Predictors of dropout were also identified.

There is good evidence that psychological problems in adulthood are associated with patterns of thinking and feeling that begin in response to a complex interplay of temperament and early life experiences. We call these patterns of thinking and feeling 'core beliefs' or 'schemas'. These patterns influence people's experiences and behaviours. Examples of core beliefs include "I am unlovable", "other people cannot be trusted" and "the world is unfair", which are often explored in depth within psychological therapy. Our research provides further support for the notion that core beliefs have a major impact on people with EDs and treatment outcomes. Core beliefs are an important focus for schema therapy, and we know that they can be changed,

modified or their influence reduced. These changes are associated with improvements in wellbeing and functioning.

Self-report questionnaires can be used to test theories and gain knowledge about how these patterns affect people, facilitating further developments in treatments. The 120-item Schema Mode Inventory for people with eating disorders (SMI-ED) was adapted from the SMI to fine-tune measurement of schema modes in people with eating disorders and provide a more accessible measure for everyday use in clinical settings. A schema mode is a temporary mindset that includes both your present emotional state and how you're dealing with it. In other words, your mode is a combination of active schemas and coping styles. The shorter form of the questionnaire (SMI-ED-SF; 64 items) was developed to provide a more succinct measure for use in the context of general clinical practice. The aim of this research is to test how well the new shorter measure performs. A shorter measure will be better for patients, easier to score and more useful in research and clinical practice.

The relationship between schema modes (patterns of feeling, thinking and behaviour), eating disorder behaviours, personality and childhood neglect were also explored. This may inform new ways of identifying and responding to people who have an ED. The SMI-ED-SF showed good validity and reliability. It also showed that specific schema modes were significantly linked to ED behaviours and personality traits. In addition, it showed ED severity can be predicted by personality, childhood neglect and schema modes.

Chapter 1: Systematic Review

Predictors of Psychological Therapy Treatment Outcome for Anorexia Nervosa: A Systematic Review

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University of Edinburgh | NHS Lothian

Abstract

Background: Anorexia nervosa (AN) has the highest mortality rate of all psychiatric conditions, alongside high rates of psychiatric comorbidity, low recovery rates and high risk of relapse after treatment. The evidence shows that AN is more resistant to treatment, hence the poorer evidence base for it. Furthering our knowledge about treatment predictors in AN will facilitate a better understanding of ways in which we can improve and expand on current evidence-based treatments for AN, potentially leading to better outcomes.

Objective: Predictors of ED outcome have been of interest in more recent years, with several reviews in this area being published. Many current reviews are based on studies using psychological and pharmacological treatments in both outpatient and inpatient settings. This will be the first review to examine predictors of both dropout and outcome in outpatient psychological therapy for AN.

Method: A systematic search was conducted of relevant electronic databases, including Psych Info; Embase; Medline, and Web of Science, alongside study reference lists. RCTs and open trials were included if they were published within the last 25 years, and participants were aged 16+ with an AN or atypical AN diagnosis. Studies were also required to include relevant outcome and predictor measures and focus on outpatient psychological therapy for AN. The methodological quality, main findings and limitations of these studies were summarised via a narrative synthesis.

Results: Sixteen studies consisting of 11 trials met the inclusion criteria. Several psychological predictors of outpatient psychological therapy outcome (e.g. ED/mental health symptoms, weight change, etc) were identified at the end of treatment and follow-up. Predictors of dropout were also identified. Significant predictors of poorer outcomes included several demographic (employment status, age, etc) and mental health variables (higher anxiety, OCD symptoms, etc), longer duration of illness, poorer eating disorder-related quality of life, poor body image, emotional avoidance, poor therapeutic alliance, lower weight, bodily pain and AN-binge/purge subtype.

Discussion: Overall, there was little consistency between the studies with regard to methodologies and measures used, and the way results were reported, which may partly explain why consistent predictors were sometimes not identified. However, it showed how many factors need to be taken into consideration when treating AN. On the whole, future research should carefully consider timing of follow-ups and consider making them longer to capture the degree of recovery, alongside using larger samples. Growth in this area will allow for stronger conclusions to be drawn about the prediction of outcome for outpatient psychological therapy for AN.

Keywords: *anorexia; outcomes; response, drop-out, predictor*

Word count: 11,414 (excluding abstracts and references)

1. Introduction

1.1 Anorexia Nervosa

Researchers have only started studying predictors of ED outcome in the last few recent years. This will be the first review to examine predictors of outcome and dropout in outpatient psychological therapy for AN. For the purpose of this review, predictors are defined as pre-treatment variables that predict treatment outcome, irrespective of treatment type, whilst moderators are pre-treatment variables identifying which individuals are more likely to benefit from a particular treatment (Kraemer, Wilson, Fairburn & Agras, 2002; Kazdin, 2007). Unlike moderators, predictors can also be studied when there are no comparison treatments (e.g. open trials) and can provide us with crucial prognostic information on a patient's likely success in therapy. The uniqueness of this review is based on our knowledge that no systematic review on predictors of outcome/dropout in outpatient psychological therapies (exclusively for AN in adulthood) exists.

Anorexia nervosa (AN) is a serious, life-threatening psychiatric illness. AN is associated with high rates of psychiatric comorbidity, low recovery rates and high risk of relapse after treatment. AN is also linked with a high mortality rate (Zipfel, Giel, Bulik, Hay & Schmidt, 2015). Although most deaths due to anorexia nervosa are a direct consequence of starvation-related medical complications, particularly cardiac complications and severe infections, one in five deaths in patients with this disorder results from suicide (Smink, van Hoeken & Hoek, 2012). Older age, lower

BMI at admission and a purging subtype of anorexia nervosa was also linked to an increased risk of death in individuals with AN (Zipfel et al., 2015).

Treatment dropout rates for AN are high, compared to other eating disorders (EDs), with a reported 29-73% attrition rate in outpatient samples. Those who drop out of therapy have an increased likelihood of hospitalisation and poor prognosis (Fassino, Piero, Tomba & Abbate-Daga, 2009). Even intensive treatment interventions have been associated with poor outcomes for this population (Keel & Brown, 2010). The causes of low recovery and treatment dropout in AN are complex and not fully understood. Thus, identifying predictors of outcome is crucial for improving our understanding of its course and responsiveness to treatment. By identifying which factors predict therapy outcomes, treatments can be improved and better matched to individuals. Psychological interventions can also be adapted and the potential for successful outcomes maximized (Agras et al., 2000).

Psychological therapies are seen as the treatment of choice for AN and several large scale trials of different psychological interventions have been published (Brockmeyer, Friederich, & Schmidt, 2017). CBT for eating disorders (CBT-E), the Maudsley Model of Anorexia Nervosa Treatment for Adults (MANTRA), Specialist Supportive Clinical Management (SSCM) and focal psychodynamic therapy are now recommended treatments for AN in adults in the United Kingdom (National Institute for Health and Care Excellence, 2017). Murray et al. (2019) carried out a meta-analysis of treatment outcome for AN, reviewing 35 RCTs, and found that treatment had a significant effect on weight at end of treatment but not at follow-up. In addition,

there was no significant treatment effect on psychological outcomes at either end of treatment (EOT) or follow-up. Overall, the evidence shows that AN is more resistant to treatment, hence the poorer evidence base for it.

Considering that a high proportion of individuals show minimal improvement in response to the 'gold standard' treatments for EDs, knowledge of the factors influencing outcome is critical to understand how, why and for whom such treatments work and what adaptations can be made to improve success rates. Furthering our knowledge about treatment predictors in AN will facilitate a better understanding of ways in which we can improve and expand on current evidence-based treatments for AN, potentially leading to better outcomes (Wollburg, Meyer, Osen & Lowe, 2013).

Compared to other EDs, AN has high rates of psychiatric comorbidity, and complexity, which hinder engagement and adherence to treatment. Herpetz-Dahlmann et al. (2001) found that anxiety disorders, avoidant-dependent and obsessive-compulsive personality disorders (PDs) were the most common psychiatric diagnoses found alongside AN. In addition, they found a significant association between psychiatric comorbidity and poorer outcomes, alongside long-term higher ED severity. This highlights the need for longer-term treatments for AN that are able to also address high comorbidity. It appears that Cluster C disorders (those that are characterised by anxious, fearful symptoms, including avoidant PD, dependent PD and obsessive-compulsive PD) are more frequently observed in those with AN than any other type of ED (Hutsebaut, Willemsen & Van, 2018). The evidence also shows that

avoidant PD usually precedes the onset of AN and continues to be a risk factor even after treatment for the ED is complete (Klump et al., 2004; Wagner et al., 2006).

Although the aetiology of AN is complex and not fully understood, genetic and environmental factors are believed to also play a part (Fairburn & Harrison, 2003). While there is evidence suggesting a genetic predisposition to both AN and OCD (Halmi et al., 1991), results from many studies also suggest that caloric deprivation has a role in either generating obsessional symptoms (Keys, Brozek, Henschel, Mickelsen & Taylor, 1950) or creating a physiological environment that exacerbates a pre-existing tendency towards obsessionality (Kaye et al., 1992). Childhood maltreatment has also been recognised as a potential environmental risk factor, with a number of studies showing a high prevalence of childhood trauma in AN (Caslini et al., 2016; Molendijk et al., 2017).

1.1. Previous Reviews

Predictors of ED outcome have been of interest in more recent years, with several reviews published (Agency for Healthcare Research and Quality, 2015; Berkman, Lohr & Bulik, 2007; Shapiro et al., 2007; Vall & Wade, 2015). Many current reviews are based on studies using psychological and pharmacological treatments in both outpatient and inpatient settings, making it unclear which specific factors affect treatment outcome. For example, Wallier et al. (2009) carried out a critical review of studies (n=7) exploring dropout from inpatient treatment for AN (including both nutritional and pharmacological treatment components as well as

psychological intervention) and found that those with binge-purge behaviours were less likely to complete treatment. However, they concluded that evidence claiming robust predictors was limited as comparisons across the seven studies were difficult due to methodological variations in definition of attrition, sample characteristics and factors they considered as potential predictors.

A larger meta-analysis, which reviewed 126 studies, looked at predictors of treatment outcome across all EDs and all types of treatment (inpatient/outpatient/medication) (Vall & Wade, 2015). Predictors of drop-out and outcome for AN, bulimia nervosa (BN) and binge eating disorder (BED) included weight suppression, binge-purge behaviours, motivation to recover, BMI, depression, weight and shape concern, general psychopathology, age of onset and illness duration. Findings were not separated between each ED diagnostic subgroup within the review.

One review also explored outcomes for both AN and BN, rating several factors as 'moderately successful' in predicting poorer treatment response, including mood and anxiety disorders and impaired social functioning (Berkam, Lohr & Bulik, 2007). However, several studies included in this review were based on participants who were recruited via community screening, and some had not received treatment. Thus, it could not be concluded that the predictors of outcome were associated with treatment or normal course of the ED. Similarly, Fassino, Piero, Tomba and Abbate-Daga (2009) carried out a comprehensive literature review which investigated factors related to drop-out from treatment for mixed EDs (n = 26). Predictors of drop-out included binge-purge subtype of AN, personality styles (e.g. low self-directedness and low

cooperativeness) and psychological traits (e.g. high maturity and impulsivity). Again, all EDs were included and the authors noted that their ability to make significant conclusions were limited due to methodological shortcomings across the studies, including small sample sizes and paucity of replication of outcomes.

1.2. Rationale and Aims of the Present Review

To our knowledge, no systematic review exploring predictors of response (outcome/dropout) to outpatient psychological therapies (involving 1-1 intervention and family processes), exclusively for AN in adulthood, exists. This paper will therefore extend the insights offered by previous reviews in several ways. AN is different to other EDs due to its high comorbidity and mortality rate. In addition, outcomes and treatment prognosis are often worse for those with AN, so more research specific to AN is needed for the development of future treatment. This will be the first review to examine predictors (including psychological predictors, BMI, demographics and duration of illness) of both dropout and outcome (progress/recovery) in AN.

A considerable number of new studies that specifically explore predictors of psychological interventions for AN have been published following the most recent reviews in 2015/2016. The current review will therefore include more recent studies which have been published in the last four years. Most reviews to date have been carried out with an AN sample consisting of children and adolescents. Treatment recommendations for children cannot always be applied to adults and recommendations are needed to improve the evidence-base for AN in the adult

population. For this reason, the current review will be exclusive to the adult population.

As many of the previous reviews were literature reviews rather than systematic reviews, and did not separate outcomes for ED diagnostic subgroups, the purpose of this review is to systematically examine the existing literature across AN alone and present a rigorous summary of the evidence for predictors of treatment outcome in adults with AN who receive outpatient psychological therapies. Finally, methodological limitations that restrict the usefulness of findings in this area will be considered and recommendations to improve the design of future treatment studies, to increase their potential to examine predictors of outcome, will also be discussed.

1.3 Research Questions

1. What were the main predictors of treatment outcome at the end of treatment and follow-up?
2. What were the main predictors of drop out?

2. Method

2.1 PRISMA Guidelines

The review was conducted in accordance with the evidence-based guidelines for systematic reviews set within the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA; Moher et al., 2009; Appendix A).

2.2 Eligibility Criteria

Papers were eligible for inclusion if they met the following criteria:

(a) Published in English language.

(b) Participants were aged 16+, inclusive of samples which had a mean age of 16 years and above.

(c) Participants all had an eating disorder diagnosis of AN or atypical/subthreshold AN, in line with either the DSM or ICD criteria, appropriate to the year the study was published. Participants who did not meet the amenorrhea criterion were also included.

(d) Included at least one psychological measure (e.g. Eating Disorder Examination Questionnaire; EDE-Q) to assess ED outcome and predictors (of treatment outcome at the end of treatment and/or follow-up, in addition to studies which examined predictors of drop out from psychological treatment). For this review, drop out was defined as treatment non-engagement (i.e. randomised to

the trial but did not start/engage in treatment) and premature termination/attrition before treatment was deemed as "complete".

(e) Used a definition of predictor of outcome or dropout, which included factors such as demographic variables (e.g. age, employment), psychological measures (e.g. mental health factors, self-esteem, body image, emotional avoidance, therapy processes/self-transcendence, therapeutic alliance), quality of life, duration of illness, weight variables (e.g. BMI), bodily pain or AN subtype. For the purpose of this review, predictors are defined as pretreatment variables that predict treatment outcome, irrespective of treatment type, whilst moderators are pre-treatment variables identifying which individuals are more likely to benefit from a particular treatment (Kraemer et al., 2002; Kazdin, 2007). Unlike moderators, predictors can also be studied when there are no comparison treatments (e.g. open trials) and can provide us with crucial prognostic information on a patient's likely success in therapy. Studies reporting the exploration of mediators and moderators were also included in the search and screened in more depth as these terms often get confused with predictors in research.

(f) Studies based on psychological therapies for AN, including 1:1 therapy/family processes: CBT, SSCM, IPT, MANTRA, focal psychodynamic psychotherapy (FPT) and family-based treatment (FBT).

(g) Therapy is required to be delivered in outpatient settings.

(h) The search was limited to articles published from 1995 to ensure this systematic review is based on the latest research within the last 25 years, and

to add to the systematic reviews which have already been published on predictors of mixed ED studies.

(i) Randomized controlled trials (RCTs) and open trials were included.

(j) To address publication bias, both published and unpublished studies were included.

Exclusion criteria:

(a) Studies included participants with a mean age of below 16 years.

(b) Any papers which included ED diagnoses other than AN or atypical AN. Studies were excluded if they did not differentiate between outcomes across ED diagnoses, but mixed ED samples were included if they reported outcomes separately for AN/atypical AN.

(c) Psychological therapy which was not based on individual outpatient or family therapy processes (thus, excluding group therapy and self-help).

(d) The psychological therapy was delivered alongside another intensive intervention or was embedded within another treatment programme, e.g. a nutritional programme which included "elements of Dialectical Behaviour Therapy (DBT)/Interpersonal Therapy (IPT)" or is non-specific e.g. "CBT-informed".

(e) The psychological intervention was not delivered in outpatient settings, e.g. it was delivered as part of inpatient treatment (to increase the likelihood that treatment outcomes are due to psychological intervention and not medical treatment).

(f) Studies which solely report medical predictors and outcomes, with no psychological measures included in the findings.

(g) Book chapters, reviews, conference papers, single case studies and qualitative studies.

2.3 Search Strategy

The primary search strategy involved searching the following electronic databases from 1995 to 4th January 2019: Psych Info; Embase; Medline, and Web of Science. The following combinations of search terms were used:

1. anorexi*
2. predict* or mediat* or moderat*
3. outcome* or respons* or effectiv*
4. treat* or intervent*

The secondary search strategy involved identifying relevant articles from scanning reference lists of trials identified in the primary search, alongside relevant review papers. A comprehensive search of unpublished theses and dissertations via ProQuest Dissertation Abstracts, European Association for Grey Literature Exploitation (EAGLE) and National Technical Information Service (NTIS) were completed to prevent publication bias. Grey literature was also reviewed using Google Scholar and www.greylit.org.

2.4 Study Selection

The primary researcher (DT) conducted the primary and secondary searches. Once search results were combined, they were cross-referenced, and all duplicate records removed. Titles and/or abstracts that were obviously not relevant were removed. Next, the title and abstract of every record was reviewed against the inclusion criteria by the primary researcher, and to maximise identification of relevant articles, the remaining 205 articles which discussed potential predictors of treatment outcome and drop out in AN were read in their entirety by the first author. Two reviewers (DT and FD) independently assessed the full texts of the final studies picked for the review, against the eligibility criteria. Reasons for exclusion were recorded and the extracted data was stored in Covidence. Of the final 16 papers that met inclusion criteria, several papers were found to be sub-analyses of the same trial, leaving 11 studies to systematically review (Table 1 shows how they were categorised). A PRISMA diagram of the selection process is presented in Figure 1.

2.5 Data Collection Process

Data was extracted using a pro-forma detailing: (a) year of publication, (b) geographical location, (c) author(s), (d) study design (e) sample characteristics/diagnosis/AN subtype, (f) type of therapy, (g) time points variables were measured, (h) psychological predictors of outcome measured, (i) outcome variables, (j) outcomes and main findings relevant to this review. Data extraction was completed by the primary researcher.

2.6 Risk of Bias

The methodological quality of studies included in the systematic review was assessed using the Cochrane Collection Risk of Bias Tool (Higgins et al 2011; Appendix B). This tool rates studies as having a low, unclear or high risk of bias according to their determined risk of selection, performance, detection, attrition, reporting and other biases. Quality ratings are organised by studies in Table 2. Risk of bias assessment was performed by the primary researcher and separately by one more author (FD) for 20% of included studies. The agreement inter-rater reliability was 90.5%. A narrative synthesis was provided of the findings from the included studies, structured around the study designs and type of outcomes.

3. Results

3.1. Study Selection

Results of search. As illustrated in Figure 1, the search yielded 2668 articles after duplicates had been removed. Titles and abstracts were then reviewed from which 2462 were excluded and one full text was unavailable as it was a prospective multidisciplinary study, which had not been fully published yet, and no contact details for the author were available online. Thus, 205 articles were obtained as being potentially eligible for the review and 189 of these studies were excluded after examination of the full text; 67 studies included mixed ED outcomes/predictors which did not differentiate AN outcomes specifically; 54 studies did not examine dropout or eating disorder specific outcomes; 37 studies assessed interventions that were not classed as outpatient psychological therapy; 21 studies did not examine predictors of outcome; 10 studies assessed treatment provided within inpatient settings. Overall, the search produced 16 papers.

Included studies. The 16 articles which met inclusion criteria consisted of 11 trials. For the purpose of this review, studies which were found to be follow-ups of the same sample dataset were considered as one trial for the write-up. The original study was reported on to reduce the risk of inflating participant numbers.

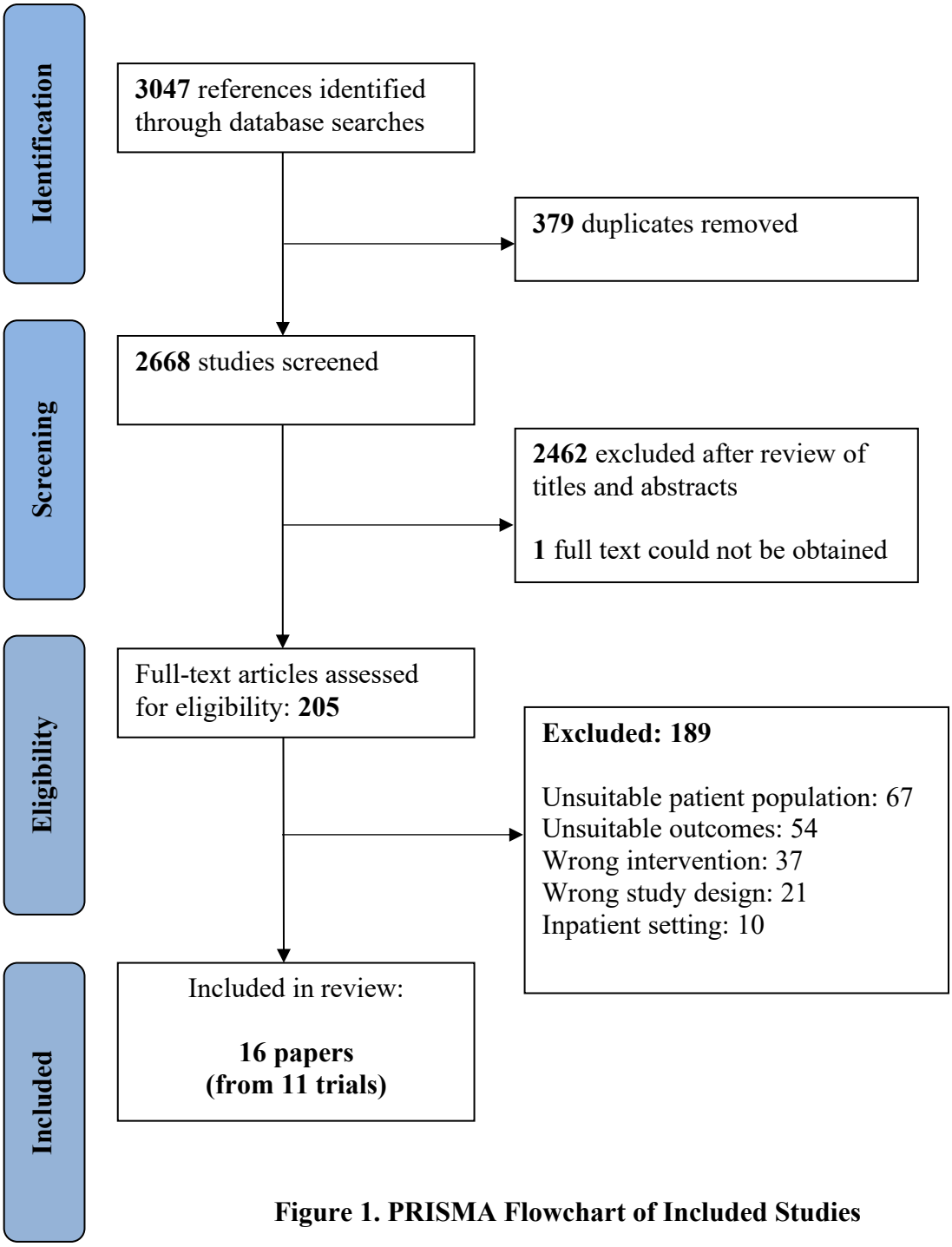

Figure 1. PRISMA Flowchart of Included Studies

3.2. Study Characteristics

The main characteristics of the included studies are described below and summarised in Table 1.

Table 1: Characteristics of included studies

Study ID	Author (Year) Country	Participants	Intervention and Design	Outcome and Predictor Measures	Key results of study
1	Lockwood, Serpell and Waller (2012) UK	• N = 40 • 100% female • Age range 20-42 years • Mean age 28 (SD = 5.69) • 28 met full ICD-10[1] diagnostic criteria for AN • (BMI[2]<17.5) • 12 met criteria for atypical AN (BMI between 17.5 and 18.5) • 27 restrictive subtype, 13 binge-purge subtype	Intervention: • Cognitive Behavioural Therapy (CBT) for Anorexia Nervosa (AN) Design: • Open trial, within-groups comparison across timepoints • Data collected at assessment and sessions 1, 6, 10 • No control	Outcomes: • Weight change across 10 sessions (BMI) • Drop out (termination of therapy before session 10) Predictors: • Eating attitudes (EDE-Q[3]) • Psychological symptoms (BSI[4])	• Early drop outs (N=6) had relatively low levels of anxiety (t=2.31, p<0.05) and phobic anxiety (t=2.75, p<0.05) at the beginning of therapy. • Higher levels of anxiety (Spearman's rho=-0.384, p<0.025) and phobic anxiety (Spearman's rho=-0.466, p<0.025) at the start of treatment were associated with poorer weight gain across 10 sessions of CBT. • More severe restraint (Spearman's rho=-0.391, p<0.025) and shape concern (Spearman's rho=-0.386, p<0.025) were associated with lower levels of weight change across the latter part of treatment (sessions 6-10).

[1] International Classification of Diseases
[2] Body Mass Index
[3] Eating Disorder Examination Questionnaire
[4] Brief Symptom Inventory

Study ID	Author (Year) Country	Participants	Intervention and Design	Outcome and Predictor Measures	Key results of study
2	McIntosh et al. (2005) New Zealand Associated references: - Carter et al. (2015) - Jordan et al. (2017)	• N = 56 • 100% female • Age range 17-40 years • Mean age 24.3 (SD =6.8) • Met DSM-IV[5] criteria for AN, excluding criterion D (amenorrhea). . Individuals with a BMI<14.5 were excluded and referred for inpatient assessment.	Intervention: • CBT vs. IPT[6] vs. SSCM[7] • 20-hour manual-based sessions over a minimum of 20 weeks Design: • RCT[8], both within groups and between groups comparison • Data collected at pre- and post, and each treatment session.	Carter et al. (2015) Outcomes: • Total and rate of weight gain over treatment • Bulimic symptoms (EDE) Predictors: • Weight suppression Jordan et al. (2017) Outcomes: • Premature termination of treatment (PTT) – completing less than 15 sessions • Self-transcendence Predictors: • Treatment credibility (Temperament and Character Inventory) • Therapy alliance (VTAS[9], VPPS[10])	Findings: Carter et al. (2015) • Weight suppression did not predict bulimic symptoms (Pearson's r=0.25, p=0.14). • Weight suppression predicted total weight gain (Pearson's r=0.35, p=0.04) and rate of weight gain (Pearson's r=0.35, p=0.04) amongst patients being treated for AN using CBT/IPT/SSCM. Jordan et al. (2017) • Treatment credibility and early patient & therapist alliance/process subscales predicted PTT. Lower self-transcendence and lower early process accounted for 33% of the variance in predicting PTT.
3	Nyman-Carlsson et al. (2019) Sweden	• N = 74 • 100% female • Age range 17-25 • Mean age 19.10 (SD =1.91) • Met DSM-IV diagnosis of AN except for amenorrhea criterion	Intervention: • CBT-E (max sixty 60-min sessions over 18 months) vs. Family-based treatment (FBT) (max forty 90-min sessions over 18 months) Design: • RCT, both within groups and between groups comparison • Comparisons made between pre- and post-treatment (at 18 months)	Outcomes: • Change in BMI • ED symptoms (EDI-3, RAB-R) Predictors: • Emotional regulation • ED symptoms	CBT group: • Lower levels of emotional dysregulation (B=-.802, p<0.001) and greater deficits in identifying and coping with inner states (B=0.509, p=0.001) were predictors of weight increase. FBT group: • Lower interoceptive deficits (B=-0.421, p=0.012) predicted an increase in weight. Bulimic behaviours (B=0.569, p=0.001) and problems with emotional regulation (B=0.473, p=0.005) were predictors of increased diagnostic symptoms.

[5] Diagnostic and Statistical Manual of Mental Disorders
[6] Interpersonal Psychotherapy
[7] Specialist Supportive Clinical Management
[8] Randomised Controlled Trial
[9] Vanderbilt Therapeutic Alliance Scale
[10] Vanderbilt Psychotherapy Process Scale

Study ID	Author (Year) Country	Participants	Intervention and Design	Outcome and Predictor Measures	Key results of study
4	Raykos et al. (2018) Australia	• N = 134 • 100% female • Age range 18-25 • Mean age 22 (SD not reported) • All met DSM-IV criteria for AN	Intervention: • CBT-Enhanced for ED Design: • Open trial, within-groups comparison • Data was collected pre- and post-treatment and at 5-weekly intervals • No control	Outcomes: • Change in BMI (over first 5 treatment sessions & over 40 treatment sessions) • Change in ED attitudes/cognitions (EDE-Q) • Change in quality of life (QoL) (QLESQ[11]) • Treatment completion (successful transition through all staged of CBT-E). Predictors: • Illness duration • Pre-treatment EDE score • Pre-treatment BMI	• There was a small association between illness duration and probability of completing treatment ($p=0.039$, pseudo-$R^2=0.10$), but the association was curvilinear (U-shaped). Overall, illness duration did not predict change in ED symptoms, QoL or BMI. • Pretreatment EDE scores did not predict outcome on any of the dependent variables. • The slope of change in BMI over treatment was associated with pretreatment BMI scores ($p<0.001$). However, this was because participants with low BMI values experienced larger improvements in BMI than participants with higher pretreatment BMIs.
5	Ricca et al. (2010) Italy	• N = 103 • 100% female • Age range 16–25 • Mean age 27.48 (SD = 10.3) • 53 participants with AN • 50 participants with sub-threshold AN (S-AN): • 35 fulfilled the DSM-IV criteria for AN except underweight • 15 fulfilled DSM-IV criteria for AN except amenorrhea.	Intervention: • CBT • Forty 1-hour manual-based sessions over a min. 40 weeks Design: • Open trial, within-groups comparison • Data collected pre-treatment (T0), end of treatment (EOT) (T1) and 3-year follow-up (T2) • No control	Outcomes: • Weight change • Treatment resistance (absence of diagnostic change if S-AN became AN) • Probability of remission across time (change in ED diagnosis evaluated at T1 & T2) • Recovery (when the criteria for DSM-IV diagnosis was not met). Predictors: • EDE-Q • Body uneasiness test • General psychopathology (SCL[12], BDI[13], STAI[14])	• Low levels of EDE-Q shape concern (and body uneasiness) at baseline were significantly associated with recovery at the end of treatment and 3-year follow-up (odds ratio, OR=0.57, 95% confidence interval, CI=0.38-0.85). • High levels of shape concern at baseline and restricting subtype were significantly related to treatment resistance (OR=3.32, 95% CI=1.66-6.63). • Shape concern rather than demographic or general psychopathological features represented the best predictor of outcome for CBT - Shape concern and body uneasiness at baseline were inversely associated with positive CBT outcomes - Shape concern and restricting subtype at baseline were positively linked with treatment resistance

[11] Quality of Life, Enjoyment, and Satisfaction Questionnaire
[12] Symptom Checklist
[13] Beck Depression Inventory
[14] State-Trait Anxiety Inventory

Study ID	Author (Year) Country	Participants	Intervention and Design	Outcome and Predictor Measures	Key results of study
					- BMI recovery at EOT and 3-year follow-up sig. correlated with shape concern reduction overtime. - Persistence of binge/purging behaviours represents a risk factor for the development of AN in subthreshold anorectic patients.
6	Sauro et al. (2013) Italy	• N = 134 • 96.2% females, 3.8% males • Age range 18-60 • Mean age 27.16 (SD = 8.58) • All met DSM-IV criteria for AN. - 97 AN-restricting type - 37 AN binge purging type	Intervention: • CBT • Forty 1-hour sessions over min. 40 weeks Design: • Open trial, within-groups comparison • Comparisons made pre- and post-treatment and 3 and 6-year follow-up • No control	Outcomes: • Remission (if participants did not fulfil DSM-IV criteria for any ED after 6 years) • Partial remission (if participant fulfilled diagnostic criteria of EDNOS[15]) • Active ED (patients fulfilled ED diagnosis – AN or BN – after 6 years. Predictors: • EDE-Q • General psychopathology (SCL, BDI, STAI) • Body uneasiness test	• Remitted patients at 6-year follow-up showed higher eating and shape concerns, compared with healthy controls. **ED psychopathology**: • Higher age was associated with lower reduction in weight (B=0.09, t=2.97, p<0.01) and shape concern (B=0.08, t=2.86, p<0.01). Higher duration of illness was associated with lower reduction in weight (B=0.06, t=2.29, p<0.05) and shape concern (B=0.05, t = 2.03, p<0.05) across time. **General psychopathology:** • Higher obsessive-compulsive symptoms were associated with lower reduction in eating concern (B=0.33, p=0.001) across time and higher depression was associated with higher reduction in eating (B=0.11, p=0.034) and shape concern (B=0.10, p=0.005) across time.

[15] Eating Disorder Not Otherwise Specified

Study ID	Author (Year) Country	Participants	Intervention and Design	Outcome and Predictor Measures	Key results of study
7	Schmidt et al. (2012) UK Associated reference: - Oldershaw et al. (2018)	• N = 71 • 93% females, 7% males • Age range 18-52 years • Mean age 26.6 (SD = 7.9) • DSM-IV diagnosis AN or EDNOS-AN which included those with BMI</=18.5kg/m^2 excluding criterion D (amenorrhea).	Intervention: • MANTRA[16] for adults vs. SSCM (MOSAIC[17] trial) • Both involved 20 weekly sessions over six months • Four 1-month follow-up sessions and two additional sessions with a close other were offered Design: • RCT, both within-groups and between-groups comparison • Data was collected at baseline, 6, 12 & 24 month follow-up	Outcomes: • Weight • ED symptoms (EDE) • Psychosocial functioning (HADS[18], Clinical Impairment Assessment) Predictors: • Emotional processing (STSS[19]) • Social cognition (Reading the Mind in the Eyes Task, RMF[20]) • Neurocognitive functioning (Wisconsin Card Sorting Task, Brixton Spatial Anticipation Task, TMT[21])	• Self-reported emotional avoidance (behavioural/ cognitive avoidance, low acceptance) and submissive behavior predicted clinical outcomes: - Avoidance of affect significantly predicted post-treatment weight (B=-0.18, p<0.01). - Greater baseline self-reported submissiveness (B=0.24, p<0.05), cognitive emotional avoidance (B=0.62, p<0.001) and less adaptive emotional acceptance and management (B=-0.40, p<0.01) significantly predicted greater ED pathology. • Social cognitive (emotion recognition, emotional theory of mind) and neurocognitive performance (set-shifting, detail focus) had limited predictive ability.

[16] Maudsley Model of Anorexia Nervosa Treatment for Adults
[17] Maudsley Outpatient Study of Treatment for Anorexia Nervosa
[18] Hospital Anxiety and Depression Scale
[19] Secondary Traumatic Stress Scale
[20] Reading the Mind in Films
[21] Trail Making Test

Study ID	Author (Year) Country	Participants	Intervention and Design	Outcome and Predictor Measures	Key results of study
8	Schmidt et al. (2015; 2016) UK Associated reference: - Cartwright et al. (2017)	• N = 89 • 97.8% females, 2.2% males • Age range 18-52 years • Mean age 23 (SD not reported) • DSM-IV diagnosis AN or EDNOS-AN which included those with BMI</=18.5kg/m^2 excluding criterion D (amenorrhea).	Intervention: • MANTRA for adults vs. SSCM (MOSAIC trial) • Both involved 20 weekly sessions over six months • Four 1-month follow-up sessions and two additional sessions with a close other were offered Design: • RCT, both within-groups and between-groups comparison • Data was collected at baseline, 6, 12 & 24 month follow-up.	Outcomes: • BMI changes • ED symptomatology (EDE & EDE-Q) • General psychopathology (DASS-21[22]) • Obsessive-compulsive symptomatology • OCI-R[23]) • Psychosocial impairment (CIA[24]) Predictors: • Session-by-session "sudden gains", defined as sudden symptom reductions occurring between two consecutive treatment sessions (BMI and psychological symptoms).	• A larger proportion of sudden gains (including psychological symptoms) predicted larger increases in BMI between baseline and 6 ($R^2 = 0.20, p < 0.01$), 12 ($R^2 = 0.21, p < 0.01$) and 24 months follow-up. ($R^2 = 0.20, p < 0.01$).
9	Touyz et al. (2013) Sydney and UK Associated references: - Abd Elbaky et al. (2014) - Le Grange et al. (2014) - Stiles-Shields et al. (2013)	• N = 63 • 100% female • Age range 20-61 years • Mean age 34.6 (SD = 9.0) • Met DSM-IV criteria for AN, excluding criterion D (amenorrhea), and had illness duration for at least 7 years	Intervention: • CBT-AN vs. SSCM • Thirty 50-minute sessions over 8 months Design: • RCT, both within-groups and between-groups comparison • Comparisons made between pre- and post-treatment and at 6 & 12-month follow-up	Abd Elbaky et al. (2014) Outcome: • Not completing treatment Predictors: • Demographic variables • Specific and health-related QoL (EDQoL, SF-12) • Duration of illness • ED symptoms (EDE) • Mood disorder symptoms (BDI) • Social adjustment (WSAS[25]) • BMI • Motivation for change (ANSOCQ[26]) Le Grange et al. (2014) Outcomes:	Abd Elbaky et al. (2014) • AN-purging subtype (X^2=8.11, df=1, p=0.008) and poorer EDQoL (t=3.06, p<0.01) significantly predicted treatment non-completion Le Grange et al. (2014) Predictors of better outcome included: • Lower age, shorter duration of illness, having AN-R, being employed, not taking psychotropic medication, better social adjustment. - e.g. Being unemployed predicted worse ED-related quality of life at EOT (controlling for baseline levels) across two treatment conditions relative to those who were employed or engaged in full-time home duties/child care (p=0.006) but not those who were currently studying (p=0.069).

[22] Depression Anxiety Stress Scale
[23] Obsessive-Compulsive Inventory-revised
[24] Clinical Impairment Assessment
[25] Work and Social Adjustment Scale
[26] Anorexia Nervosa Stages of Change Questionnaire

Study ID	Author (Year) Country	Participants	Intervention and Design	Outcome and Predictor Measures	Key results of study
				• Used the predictor measures above to assess outcome as well as mental health Predictors: • Age • Duration of illness • Having AN-restrictive type • Employment • Psychotropic medication • Social adjustment Stiles-Shields et al. (2013) Outcomes: • BMI, EDE, BDI Predictors: • Quality of therapist-patient relationship from patient's perspective (HRQ[27])	Unemployment also predicted worse mental health at EOT (controlling for baseline levels) relative to those who were employed or engaged in full-time home duties/child care (p=0.001) and those who were currently studying (p=0.005). Similarly, being unemployed predicted higher depressive symptoms at EOT across the two treatment conditions compared to those who were employed or engaged in full-time home duties/child care (p=0.004) and those who were currently studying (p=0.036). Stiles-Shields et al. (2013) • Early therapeutic alliance (TA) significantly predicted 'Restraint' (B=-0.26, p=0.02) and 'Shape Concern' (B=-0.26, p=0.008) at 12-month follow-up. Late TA was a significant predictor of treatment BMI (B=-0.33, p<0.001), BDI score (B=-0.51, p<0.001) and EDE Global score (B=-0.27, p=0.003) symptomatology at EOT and follow-up (with exception of eating concern at follow-up (p=0.07)). Overall, TA is a significant predictor of outcome.
10	Wade, Treasure and Schmidt (2011) Australia	• N = 33 (5 failed to engage, 5 dropped out, 23 completers – 22 females and 1 male • Gender ration not stated • Age range not stated • Mean age 27.01 (SD = 1.62) • All met DSM-IV criteria for AN with the exception that BMI was less than 19 and amenorrhea was not required.	Intervention: • MANTRA for adults (25 1-hour sessions over a 10-month period) Design: • Open trial, within-groups comparison • Data collected pre- and post-treatment, and sessions 2, 5, 10. Comparisons also made at 3 and 12-month follow-up. • No control	Outcomes: • "Good outcome" - Obtaining a BMI >18.5. and a global EDE score <1 SD from the Australian community norm. • "Moderate outcome" - Obtaining a BMI >18.5. and a global EDE score <1.5 SD from the norm OR obtaining a BMI >18. and a global EDE score <1 SD from the norm (any other outcome was categorised at "poor"). • Drop out (those who started therapy but did not complete at least 19 of the 25 sessions)	• All of those who dropped out of therapy binged or purged. Those who dropped out were significantly more likely to binge or purge compared those in the failure to engage group (X^2=8.00, df=1, p=0.005) and in the completers group (X^2=6.77, df=1, p=0.009). Overall, bingeing and purging was a significant predictor of dropout. • Lower baseline self-esteem (t(20)=2.36, p=0.03) and 'ineffectiveness' (t(21)=-2.43, p=0.02) predicted poor outcome.

[27] Helpful Responses Questionnaire

Study ID	Author (Year) Country	Participants	Intervention and Design	Outcome and Predictor Measures	Key results of study
				Predictors: • BMI • EDE • AN stages of change (ANSOCQ) • Depression and anxiety sub-scales of depression, anxiety and stress scale • Perfection and ineffectiveness sub-scales of the EDI • Rosenberg self-esteem scale	
11	Zipfel et al. (2014) Worldwide Associated references: - Friederich et al. (2017) - Junne et al. (2018) - Wild et al. (2016)	• Total N of ANTOP[28] study = 242 • 100% female • Age range 18-56 years • Mean age 27.4 (SD = 7.8) • DSM-IV diagnosis of full-syndrome/ subthreshold AN (BMI 15-18.5) Friederich et al. (2017) • N = 89 (a subsample chosen based on those where recordings were available to use) Junne et al. (2019) • N = 148 (a subsample of the ANTOP study that was eligible to be included in the path analysis based on the completeness of all included datasets) Wild et al. (2016) • N = 169 (at 1-year follow-up, 73 patients had no BMI measurement and therefore excluded from the study)	Intervention: • Focal psychodynamic psychotherapy (FPT) vs. CBT-E vs. treatment as usual (TAU) • 40 sessions over 10 months Design: • RCT, both within-groups and between-groups comparison • Comparisons made at pre and post-treatment, 4 then 10 months into treatment, and 3-month and 1-year follow-up	Friederich et al. (2017) Outcomes: • BMI • EDI-2 • Body image disturbances (BIQ-20[29]) • (SIAB-X[30]) • PHQ-9[31], GAD-7[32] Predictor: • Expression of negative emotions Junne et al. (2019) Outcomes: • As above Predictor: • Body image Wild et al. (2016) Outcomes: • As above Predictors: • Baseline BMI	Friederich et al. (2017) • Greater expression of negative emotions during mid-treatment predicted favourable outcomes in BMI (B=0.307, p<0.05) & ED psychopathology (B=-0.233, p<0.05) at end of treatment. Junne et al. (2019) • Negative evaluation of the body at baseline predicts perceived stress during therapy, which in turn predicts depressive symptoms at the end of therapy, which in turn predicts BMI (B=-0.24, p<0.01) and ED symptoms (B=0.31, p<0.01) at 12-month follow-up. Wild et al. (2016) • The strongest predictor of BMI and recovery at 1-year follow-up was a higher baseline BMI (B=0.75, p<0.0001). Negative predictors of BMI and recovery were duration of illness >6years (B=-0.75, p=0.03) and a lifetime depression diagnosis at baseline (B=-0.63, p=0.04). Overall, higher

[28] Anorexia Nervosa Treatment of Outpatients
[29] Body Image Questionnaire
[30] Structured Inventory for Anorexic and Bulimic Disorders
[31] Patient Health Questionnaire
[32] Generalised Anxiety Disorder Assessment

Study ID	Author (Year) Country	Participants	Intervention and Design	Outcome and Predictor Measures	Key results of study
		These samples' baseline characteristics did not significantly differ from the original ANTOP sample.		• Duration of illness • Psychiatric comorbidity (SCID-I[33]), including depression diagnosis at baseline • Health related quality of life (including bodily pain) (SF-36) • Self-esteem (RSES[34])	baseline BMI, shorter illness duration and lower depression led to a better outcome. • Higher bodily pain was significantly associated with a lower BMI B = -0.01, p=0.01). Self-esteem was a positive predictor for recovery at 1-year follow-up (OR=1.05, 95% CI=1.01-1.10, p=0.03).

[33] Structured Clinical Interview for DSM-IV Axis I Disorders
[34] Rosenberg Self-Esteem Scale

Study design. Five studies were open trials, using a pre- and post-intervention design with no control group (1, 4, 5, 6, 10). The other six trials were RCTs. The 11 trials included a total of 1039 participants and were published between 2010 and 2019. One trial (9) was carried out in Australia and London, another in Germany (11) and one in New Zealand (2). Two trials were carried out in Australia (4, 10), three in London (1, 7, 8), two in Italy (5, 6) and one in Sweden (3). Outcome measures were assessed at baseline in all of the studies. Eight studies reported end of treatment (EOT) outcomes (within trials 1, 2, 4, 5, 6, 9, 10, 11) and eight studies reported outcomes at follow-up (within trials 3, 5, 6, 7, 8, 9, 10, 11). Follow-ups ranged between three months to six years.

Sample characteristics. Sample sizes ranged from 33 (10) to 242 (median = 74). The age of adults ranged between 16 and 62 years across the 11 trials. Mean age ranged from 19.10 (SD=1.91) [3] to 34.6 (SD=9.0) [9]. Three trials included males (6, 7, 8); [6] included 3.8% males (N=134), [7] included 7% males (N=71) and [8] included 2.2% males (N=89). The other eight trials included samples which were 100% female. One trial (9) included participants who all had an illness duration of at least seven years, classing it as 'severe and enduring' AN (SE-AN). Two trials also included those with EDNOS-AN as well as AN (7, 8). One trial distinguished between participants who had AN-restricting type and AN-binge purging type (6).

Interventions. Table 1 presents specific details of the content of each intervention. Three trials included Maudsley Anorexia Treatment for Adults (MANTRA) as an intervention (7, 8, 10) and three studies included Specialist

Supportive Clinical Management (SSCM) (7, 8, 9). Eight trials included CBT as an intervention. Of these, one article compared CBT-AN to SSCM (9). One trial compared CBT with IPT and SSCM (2). One trial compared CBT with Focal Psychodynamic Psychotherapy (FPT) and treatment as usual (TAU) (11). Four trials evaluated the effects and identified predictors of outcome of individual CBT alone, with no comparison (1, 4, 5, 6). The number of treatment sessions ranged from 10 (1) to a maximum of 60 (3). The period over which treatment was delivered ranged from 5 (2) to 18 months (3).

Outcomes. Two trials explored predictors of treatment dropout (2, 9). The other nine trials examined predictors of treatment outcome. Two of these studies explored predictors of both treatment outcome and treatment dropout (1, 10). All 11 trials exploring treatment outcomes used body mass index (BMI) or weight change as an outcome measure, as well as psychological measures. Seven of these studies also explored ED psychopathology outcomes which were measured using the Eating Disorder Examination (EDE), Eating Disorder Examination Questionnaire (EDE-Q) or Eating Disorder Inventory (EDI-3) (2, 3, 4, 7, 9, 10, 11). Three studies used general psychopathology as one of their outcomes using Beck's Depression Inventory (BDI), Patient Health Questionnaire (PHQ-9), General Anxiety Disorder Questionnaire (GAD-7), Hospital Anxiety and Depression Scale (HADS) and the Mental Health Component Scale (MCS) (7, 9, 11). Two studies examined quality of life as an outcome (4, 9). Two studies used the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) diagnostic criteria as a measure of treatment success (5, 6); [5] explored 'probability of remission across time' (change in ED diagnosis from T1 to

T2) and ‘recovery’ (when the criteria for the DSM-IV is not met) as outcomes; [6] used ‘remission’ (i.e. participants do not fulfil DSM-IV criteria for any ED after 6 years), ‘partial remission’ (i.e. participants fulfil diagnostic criteria for ‘eating disorder not otherwise specified’; EDNOS) and ‘active ED’ (participants fulfil ED diagnosis of AN after 6 years) as outcomes.

There was also a substantial variation in definition of dropout. One trial (9) defined dropout using three terms: (a) treatment non-engagement (randomised but did not engage in treatment), (b) early attrition (less than 15 weeks of treatment completed) and (c) late attrition (completing 15-29 weeks of treatment). One study (2) defined premature termination of treatment (PTT) as ‘completing less than 15 sessions’ and defined treatment completion as ‘completing 15 or more of 20 (75%) scheduled sessions’. Another study (1) defined dropout as ‘termination of therapy before session 10’ and one study (10) defined dropout as ‘those who started therapy but did not complete at least 19/25 sessions’.

3.3. Predictors of Outcome and Dropout

Demographic variables

Age. Two trials examined age (6, 9), reporting that lower age significantly predicted improved ED-related quality of life, improved mental health and decreased depressive symptoms at the end of treatment, but not at follow-up (9).

Correspondingly, higher age was significantly associated with lower reduction of ED psychopathology across time (6).

Employment. One study examined employment status (9) and reported that being unemployed significantly predicted worse ED-related quality of life at EOT (controlling for baseline levels) across two treatment conditions relative to those who were employed or engaged in full-time home duties/child care but not those who were studying. Unemployment also significantly predicted worse mental health and higher depressive symptoms at EOT (controlling for baseline levels) relative to those who were employed or engaged in full-time home duties/child care *and* those who were currently studying. Employment was not a significant predictor of outcome at follow-up.

Social adjustment. One study examined social adjustment (9) and reported that better social adjustment significantly predicted improved mental health at the end of treatment, but not at follow-up.

Mental Health

Anxiety. One study examined anxiety levels at the beginning of treatment (1), and reported that higher initial levels of anxiety were significantly associated with slower levels of weight gain across 10 sessions of CBT and that low levels of anxiety at the beginning of therapy predicted dropout.

Depression. Two studies examined depression (6, 11), with one reporting that higher values of BDI scores (at baseline, EOT, 3-year and 6-year follow-up) were significantly associated with higher reduction in eating and shape concern (ED psychopathology) across time (6). The other study reported that a lifetime depression diagnosis at baseline was a negative predictor of BMI and recovery (11).

Obsessive compulsive symptoms. One study examined obsessive-compulsive (OCD) symptoms (6), and reported that higher OCD symptoms were significantly associated with lower reduction in ED concern overtime.

Psychotropic medication. One study explored psychotropic medication (9), reporting that taking psychotropic medication at baseline significantly predicted worse ED-related quality of life and increased depressive symptoms at the end of treatment. It also significantly predicted worse mental health at 6-month follow-up.

Self-esteem

Two studies examined self-esteem (10, 11), reporting that lower baseline self-esteem and 'ineffectiveness' (perceiving the self as ineffective) significantly predicted poor outcome, i.e. their BMI did not increase to above 18.5 and their EDE scores did not improve significantly (10). Self-esteem was also found to be a positive predictor for recovery (in terms of BMI and EDI-2) at 1-year follow-up (11).

Duration of illness

Four studies examined duration of illness (4, 6, 9, 11), with three studies finding that duration of illness significantly predicted outcome; [9] found that shorter duration of illness predicted improved ED-related quality of life, improved mental health and decreased depressive symptoms at the end of treatment; [6] reported that higher duration of illness was associated with lower reduction of ED psychopathology across time; [11] found that if duration of illness exceeded six years, it negatively predicted BMI and recovery. Overall, shorter illness duration led to a better outcome. However, one study (4) reported that greater levels of illness severity/duration did not predict changes in ED symptoms, quality of life or BMI.

Body image

Four studies examined body image (1, 5, 6, 11). One study reported that negative evaluation of the body at baseline significantly predicted stress during psychotherapy, which in turn predicted depressive symptoms at the end of therapy, which in turn significantly predicted the treatment outcomes (BMI & EDI-2) at 12-months follow-up (11). Another study found that more severe restraint and shape concern were significantly associated with lower levels of weight change across the latter part of treatment (sessions 6-10) (1). Similarly, one study reported that shape concern and body uneasiness was the best predictor of outcome for CBT; shape concern at baseline was positively linked with treatment resistance, and shape concern reduction overtime significantly correlated with BMI recovery at the end of treatment and 3-year follow-up (5). In addition, one study found that remitted patients at 6-year

follow-up showed significantly higher eating and shape concerns, compared with healthy controls (6).

ED quality of life

One study which explored predictors of dropout examined quality of life (9), reporting that poorer EDQoL significantly predicted treatment non-completion.

Emotional avoidance / ability to express and regulate emotions

Three studies examined factors linked to expressing and regulating emotions (3, 7, 11). One study examined expression of negative emotions (11) and found that greater negative emotion expression during mid-treatment significantly predicted BMI at the end of treatment alongside lower ED psychopathology at the end of treatment and 12-month follow-up. Particularly, expressions of sadness and anger predicted BMI at the end of treatment, whereas anxiety expressions did not.

One study explored emotional dysregulation and interoceptive deficits (ability to identify and cope with inner states) (3), reporting that lower levels of emotional dysregulation and greater interoceptive deficits were significant predictors of weight increase in participants who received CBT. Contrastingly, for participants who received FBT, lower interoceptive deficits significantly predicted an increase in weight.

One study examined emotional avoidance and submissive behaviour (7), showing that self-reported emotional avoidance (behavioural/cognitive avoidance, low acceptance) and submissive behaviours significantly predicted clinical outcomes (weight, ED psychopathology, psycho-social functioning). More specifically, "avoidance of affect" significantly predicted posttreatment weight. Greater baseline self-reported submissiveness (self-sacrifice), cognitive emotional avoidance (need to "anticipate and distract" from emotion) and less adaptive emotional "acceptance and management" significantly predicted greater ED pathology. This study also found that social cognitive (emotion recognition, emotional theory of mind) and neurocognitive performance (set-shifting, detail focus) had limited predictive ability.

Self-transcendence and psychotherapy process

One study examined self-transcendence and psychotherapy process (2) which was measured using the self-transcendence scale on the temperament and character inventory (TCI). Characteristics of low transcendence include self-consciousness, impatience and concreteness. Lower self-transcendence and lower early process (patient participation/therapist warmth and friendliness) accounted for 33% of the variance in predicting premature termination of treatment (PTT).

Therapeutic alliance

Two studies examine therapeutic alliance (2, 9). One study exploring predictors of outcome (9) found that early therapeutic alliance (TA) significantly

predicted ‘restraint’ and ‘shape concern’ at 12-month follow-up and late TA was a significant predictor of weight change, depressive symptomatology and ED symptomatology at EOT and follow-up (with exception of eating concern at follow-up). One study looking at predictors of drop out (2) reported that treatment credibility (i.e. how helpful/unhelpful participants thought treatment would be) significantly predicted premature termination from treatment (PTT). Early patient and therapist alliance/process subscales significantly predicted PTT; low scores on the VTAS-R (patient rating on the therapeutic alliance) and the VPPS (patient exploration, therapist exploration and therapist warmth subscales) significantly predicted PTT. Overall, TA was described as a significant predictor of outcome and dropout.

Weight variables

Three studies explored whether weight and BMI were possible predictors of outcome (2, 8, 11). Higher levels of weight suppression (difference between highest lifetime weight at adult height and weight at pretreatment assessment in kg) at pretreatment was significantly associated with greater total weight gain and faster rate of weight gain amongst women being treated for AN as outpatients (2). A larger proportion of sudden gains (in BMI and psychological symptoms) occurring between two consecutive treatment sessions, significantly predicted larger increases in BMI between baseline and 6, 12 and 24 months follow-up (8). Higher baseline BMI was the strongest predictor of BMI and recovery at 1-year follow-up (11).

Bodily pain

One study examined bodily pain (11), reporting that higher bodily pain (measured using a subscale of the SF-36) was significantly associated with a lower BMI at 1-year follow-up.

AN sub-type

Four studies examined AN subtype and whether having restrictive AN (AN-R) or bulimic symptoms (AN-BP) predicted outcome and dropout (3, 5, 9, 10). Two outcome studies examined AN-R. One study reported that having restricting subtype at baseline was positively linked with treatment resistance, i.e. absence of diagnostic change if subthreshold-AN became AN (5). Another study reported that individuals with AN-R had improved ED-related quality of life, improved mental health and decreased depressive symptoms at 12-month follow-up, compared to individuals with AN-BP (9). Two outcome studies examined bulimic behaviours/symptoms. One study found that bulimic behaviours were significant predictors of increased ED diagnostic symptoms (3) and the other study reported that persistence of binge-purging behaviours represented a risk factor for the development of AN in subthreshold anorectic patients (5). Overall, having AN-R significantly predicted treatment resistance. However, compared to those with AN-BP, those with AN-R reported a better ED-related quality of life and improved mental health symptoms at follow-up, and that those with binge-purge behaviours are at risk of developing more serious ED symptoms in the future.

Two studies which explored predictors of dropout also examined AN-purging subtype (9, 10). Both studies reported that AN-binge/purge subtype significantly predicted treatment dropout. Thus, bingeing and purging were significant predictors of dropout.

3.4. Risk of Bias within Studies

Table 2 provides a summary of the 'Risk of Bias' assessment carried out by the Cochrane Collaboration's Tool, which is used for assessing risk of bias in randomised trials (Higgins et al., 2011). Overall, the results ranged from low to high risk of bias, subject to the reporting and available data.

Table 2. Risk of Bias Summary (Cochrane Collaboration's Tool)

Study ID	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding participants and personnel (performance bias)	Blinding outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Other sources of bias (other bias)
1. Lockwood, Serpell and Waller (2012)	High	High	High	Unclear	Unclear	Unclear	Unclear
2. McIntosh et al. (2005)	Low	Unclear	High	Unclear	Low	Unclear	Unclear
3. Nymann-Carlsson et al. (2017)	Low	Low	High	Unclear	Unclear	Unclear	High
4. Raykos et al. (2018)	High	High	High	Unclear	Unclear	Unclear	Unclear
5. Ricca et al. (2010)	High	High	High	Unclear	Low	Unclear	Unclear
6. Sauro et al. (2013)	High	High	High	Unclear	Low	Unclear	High
7. Schmidt et al. (2012)	Low	Low	High	Low	Low	Unclear	Unclear
8. Schmidt et al. (2015; 2016)	Low	Unclear	High	Low	Low	Low	Unclear
9. Touyz et al (2013)	Low	Low	High	Low	Low	Unclear	Unclear
10. Wade, Treasure and Schmidt (2011)	High	High	High	Unclear	Low	Unclear	Unclear
11. Zipfel et al. (2014)	Low	Low	High	Low	Low	Low	Unclear

Key: High = high risk, Low = low risk, Unclear = unclear risk

Allocation. The method used to generate and conceal the allocation sequence to interventions was assessed to determine the risk of biased allocation to interventions. Four trials described a random component in the method of allocation sequence and made a specific reference to the concealed allocation of participants, showing low risk of bias. Two trials organised this through an independent coordination centre (9, 11). Two trials used closed envelopes to conceal allocation of participants (3, 7). Two trials described a random component in the method of sequence but did not report on the strategies used to randomize participants or conceal allocation (2, 8), thus risk of bias for this component was classed as unclear. Five trials did not use random sequence generation or conceal allocation, as they used a pre- and post-intervention design without a control group (1, 4, 5, 6, 10), which meant risk of bias was high.

Blinding. Given the nature of the intervention, it was not possible to blind either therapists or patients to the type of treatment being implemented or received. Nevertheless, detection bias may be minimised by blinding outcome assessors from knowledge of the received intervention. Four trials had a low risk of bias in this area (7, 8, 9, 11) by reporting that the researchers who conducted all outcome assessments were blinded. Seven trials did not provide sufficient information about whether assessors were blinded or not (1, 2, 3, 4, 5, 6, 10), presenting high risk of bias.

Incomplete data. An assessment was made of the amount, nature and handling of incomplete data. Five studies (2, 4, 5, 6, 9) presented a low risk of bias,

reporting on attrition and exclusions from the analysis, the numbers in each intervention group and reasons for attrition/exclusions. Six studies (1, 3, 7, 8, 10, 11) reported on attrition and exclusions from the analysis, but reasons for attrition/exclusions were not reported, hence risk of bias was unclear. Overall, six studies (2, 5, 7, 8, 9, 11) used intention-to-treat analysis and dealt with missing data appropriately.

Selective reporting. Two trials (8, 11) reported the availability of the study protocol, reporting the pre-specified outcomes, displaying low risk of bias. The remaining studies were rated as unclear risk of reporting bias, because the availability of the study protocol was not reported. All studies appeared to report the results to the statistical analyses carried out and reported the results to follow-up appropriately.

Other potential sources of bias. Two studies did not mention treatment fidelity and how they ensured adherence to the treatment model (3, 6), indicating a high risk of bias. There was insufficient information to determine whether a risk of bias existed across the remaining nine studies.

4. Discussion

The purpose of this systematic review was to identify the predictors of treatment outcome and dropout for adults with AN following individual outpatient psychological therapy. Sixteen papers consisting of 11 trials were included in this review, and the majority of studies were primarily designed to evaluate predictors of treatment outcome. Some predictors were reported in post-hoc exploratory analyses from larger effectiveness trials. The variables explored were highly heterogeneous as studies tended to analyse variables that were not selected on the basis of theory, but were rather selected for analysis due to being routinely collected as part of the clinical trial. Due to the heterogeneity of this data, it was not possible to conduct a meta-analysis.

4.1 Main Findings

Several variables were found to be predictors of treatment outcome and dropout. Improved outcomes were significantly predicted by being younger, employed, having better social adjustment and a briefer duration of illness. It appears that this patient population can make meaningful clinical gains regardless of treatment modality, provided that some or all of these parameters are met. However, it must be noted that these variables were only related to outcome in the short-term (i.e. at EOT). Therefore, the influence of these factors, such as illness chronicity, on outcome was limited as they were non-significant at follow-up. Not being on medication was

classed as another significant predictor. However, the type of medication an individual is on, how the individual responds to medication and side-effects must be taken into consideration. It is also possible the presence of medication at baseline is a result of an underlying comorbidity. Thus, conclusions about medication must be made with caution.

Studies examining AN subtype were consistent with other trials that explored inpatient treatment for AN, which also reported that AN-purging subtype predicted treatment dropout in hospital settings (Wallier et al., 2009). Bulimic behaviour and emotional dysregulation were also significant predicters of poorer outcomes and increased diagnostic symptoms. This is consistent with previous studies which reported associations between AN and emotional dysregulation (Racine & Wildes, 2013; Svaldi, Griepenstroch, Tuschen-Caffier & Ehring, 2012). Poorer impulse control is characteristic of bulimic psychopathology and both of these difficulties were related to negative outcomes of FBT (Nyman-Carlsson et al., 2019). In comparison, in the CBT group, lower emotional dysregulation (i.e. higher emotional regulation) alongside greater deficits in identifying and coping with inner states were significant predictors of weight increase, i.e. if they were unable to connect with inner states, they were possibly more able to tolerate weight increase. Positive outcomes within CBT groups may be an indication that patients are continuing to use avoidance as a way of coping with recovery (instead of truly connecting with and regulating their underlying, deeper emotions). It would be interesting to look at longer-term outcomes to see if

these positive changes were maintained. It is possible that recovering in this "detached protector mode" will lead to later relapse, an area for debate / further research.

Contradictory to the above findings, emotional avoidance and submissive behaviour were found to predict poorer outcomes; they were a strong predictor of ED pathology at posttreatment. The idea that emotion avoidance and lack of emotion acceptance may maintain AN is consistent with previous research in the field. Avoidance of emotion supports the theory that focusing on weight and shape gives people with AN better ability to avoid emotions (Sternheim, Startup, Saeidi et al., 2012). This is also in line with hypotheses that AN is functional for sufferers in that it gives them a means of escape from difficult emotions. Greater expression of negative emotions by patients during mid-treatment also predicted favourable treatment outcomes. This is consistent with previous psychotherapy research showing strong relationships between emotional processing and treatment outcome (Watson & Bedard, 2006). Enhanced emotional processing during therapy for AN may help patients develop their emotion regulation skills.

Early therapeutic alliance significantly predicted several ED symptoms, but not change in weight or depression, whereas late therapeutic alliance predicted all ED and depressive symptoms, with the exception of eating concern at follow-up. These findings show that though good therapeutic alliance may be present early in treatment, for patients with severe and enduring AN, the potential benefits of the therapeutic relationship to treatment outcome may need more time to grow. Alternatively, some

treatment models look at early behavioural change to increase the success rate in ED treatment, and sometimes therapeutic alliance can grow through this.

Results showed that a higher BMI at baseline is a strong predictor of positive outcome in AN outpatient therapy. It was argued that higher levels of weight suppression at pretreatment is predictive of greater total weight gain and faster rate of weight gain over treatment. However, it would be expected that people who are lower in weight have more weight to gain. Higher bodily pain predicted lower BMI at 1-year follow-up. This may be due to bodily pain being associated with low bone mineral density (BMD) or osteoporosis, which are frequent complications of AN. It is also possible that over-exercising and muscle fatigue is correlated with a higher bodily pain score (Wild et al., 2016).

Negative evaluation of the body was found to have an impact on stress and depressive symptoms, which in turn leads to less favourable outcomes in patients with AN in outpatient therapy. A comorbid diagnosis of depression and anxiety at baseline was also found to be predictive of worse outcomes with regard to BMI and global outcome in studies 1, 6 and 11, consistent with previous studies (Calugi et al., 2014; Godart et al., 2007). In contrast, Wild et al. (2016) reported that anxiety disorders, OCD and alcohol abuse were not significant predictors of outcome. Overall, comparisons regarding comorbid depression between studies are difficult to make due to differences in study settings and samples.

Overall, there was little consistency between the studies. Methodological limitations and disparities across studies may partly explain why consistent predictors were sometimes not identified. Research into what predicts outcomes and dropout also requires larger sample sizes to have adequate power (Fritz & Mackinnon, 2007).

4.2 Strengths of the Review

To maximise the quality of the research and reduce sources of bias, this review was completed in accordance with PRISMA (Moher et al., 2009). Furthermore, the electronic search was complemented with searching through reference and citation lists, which added to the strength of the review. The cross-checking of articles by a second reviewer also reduced the risk of bias regarding study selection. Effort was made to reduce publication bias by attempts to contact authors in the field and searching theses databases and grey literature. Using a standard risk of bias tool allowed for comparisons across a variety of study designs, and inter-rater reliability was found to be 90.5%.

4.3 Limitations of the Review

There were a number of limitations associated with this review. First, to reduce bias, the systematic review should have been pre-registered on PROSPERO. Moreover, due to a lack of available translation software, only English language studies were included, and this may introduce some degree of bias in our results.

Another limitation of the review is the exclusion of qualitative studies, which may have provided more insight into the experiences and perceptions of people with AN who receive psychological therapy in outpatient settings.

The review is limited to the use of a qualitative systematic review approach. Heterogeneity between the studies, particularly with regard to design, interventions, variables explored, statistical analyses used and methodological flaws across the studies meant it was not possible to conduct a meta-analysis and it would have reduced the meaningfulness of a meta-analysis if one was attempted.

The majority of studies failed to report effect sizes or provided data required to calculate effect sizes. It was therefore not possible to evaluate the extent to which statistically non-significant predictors comprised cases of underpowered tests, and this review could only rely on statistical significance for drawing conclusions. With regard to publication bias, significant results may have been reported when in fact they were not. A meta-analysis was not possible due to heterogeneity of the way findings were reported.

Although a standard risk of bias tool was used, making it possible to compare a diverse range of studies, it was designed to evaluate RCTs, so application of it to uncontrolled trials resulted in a significant proportion of the studies being rated as "high" or "unclear risk" for selection bias. As the majority of the ratings on the risk

of bias tool were mostly “high” or “unclear risk”, caution is required when interpreting the results of the studies included in this review.

Overall, there was little consistency between the studies. Methodological limitations and disparities across studies may partly explain why consistent predictors were not identified. Most findings are not representative of patients with severe starvation, and are mostly only valid to patients who find their way to treatment. Thus, it is possible these results are not generalizable to AN patients who do not readily seek treatment. Another notable limitation was that most studies examined predictors in post-hoc exploratory analyses using data collected to define the sample (e.g. demographics) and/or to evaluate treatment efficacy (e.g. baseline levels of outcome). Focusing on theoretically grounded variables in future studies may help to identify consistent and robust predictors of outcome and dropout.

4.4 Recommendations for Future Research

Several recommendations can be made for future research. First, researchers conducting treatment studies should plan from the outset to test predictors of outcome and dropout, as it can provide valuable information. It would allow researchers to formulate a clear set of theory-driven hypotheses and allow them to explore the types of variables that are likely to impact outcome/dropout. Predictors would then be selected based on theory explored in a way that is appropriate for the specific research question.

Second, comparison of results across studies and amalgamating data from multiple independent studies is needed to identify robust predictors of outcome and dropout. This is difficult because outcomes vary greatly across studies. This review highlights the issue of disparate definitions of treatment outcome and dropout and an agreed definition of recovery and dropout is needed. In line with the transdiagnostic perspective, treatment outcome should encompass disordered eating behaviours, cognitions and body weight (Linardon et al., 2017). Bardone-Cone et al. (2010) recommended defining recovery as (i) BMI >/=18.5; (ii) abstinence from bingeing, purging and fasting for three months; and (iii) achieving an EDE-Q global score within healthy population norms. It is vital that a clear definition of recovery like this is used across studies to advance the field.

Third, statistical data for non-significant findings should be reported, which should also be supported by pre-trial registration. Currently, papers vary widely on the data they report, making it difficult to compare findings, draw conclusions and make clinical and policy recommendations.

Fourth, to reduce the potential risk of bias, future studies should use an RCT design to reduce selection bias and recognise the importance of intention-to-treat analysis to lower attrition bias. Randomisation and blinding are also important to ensure there is no bias in selection and may provide further insight into predictors and the effectiveness of outpatient interventions for adults with AN. It may also reduce

the risk of performance bias due to failure to blind participants to the type of interventions received. Researchers should also control for potential confounding factors, such as length of time participants have had AN for and length of treatment. Additionally, most outcome measures were self-report and conclusions could have been strengthened by more objective observations from family members/health professionals, to validate participants' accounts. Future research should also carefully consider timing of follow-ups and consider longer follow-ups to capture the degree of recovery, bearing in mind that people with severe and enduring AN may take a longer time to fully recover. On the whole, larger samples and interviewer-based outcome measures may strengthen future studies.

4.5 Implications for Clinical Practice

Findings from the reviewed studies highlight important targets for therapeutic interventions. Submissiveness and emotional avoidance (both cognitive and behavioural) alongside a lack of emotional acceptance are factors which maintain AN, and need targeted. Therapies that include more experiential techniques may help with emotional avoidance difficulties, e.g. components of mindfulness-based therapy (Teasdale et al., 2000) or acceptance and commitment therapy (Hayes, Luoma, Bond, Masuda & Lillis, 2006), may aid those with AN. Likewise, emotion-focussed therapy may help patients to recognise. accept and express their emotions in a more adaptive way (Dolhantry & Greenberg, 2009).

Given that lower self-esteem and higher levels of ineffectiveness at baseline distinguished those with poor and good outcome (Wade et al., 2011), an early focus on improving self-esteem and ineffectiveness could be important for enhancing therapy outcome in AN. Specific targeting of body image in the treatment of AN can also be supported, but given its adverse effect on stress and affective symptoms in addition to outcomes, body image directed interventions should be accompanied by explicit strategies for stress reduction (Junne et al., 2018).

The finding that poor EDQOL at baseline predicted attrition, highlights the importance of further examination of this relationship and interventions to disrupt the cycle of functional decline in patients with AN and treatment dropout. Therapy may need to be modified to address the needs of those with greater deficits in adaptive functioning. On the one hand, it can be argued that the more severely ill patients are in terms of behavioural, social and psychological factors (EDE global and subscale scores), the more likely they are to drop out of therapy (unaffected by the specific psychological therapy they received). Therefore, clinicians should bear in mind that those with more severe ED illnesses are potentially more likely to terminate treatment early, thus need to allow more time and effort to engage and retain these patients in therapy. On the other hand, it cannot be guaranteed that dropout was not a result of positive outcome.

The trials examining therapeutic alliance suggest that alliance and process should be assessed to deepen therapist's understanding of the relationship to reduce

the likelihood of a poor alliance impacting outcome or potentially leading to premature termination of therapy. Moreover, the importance of considering patient preferences in AN therapies has been highlighted to ensure a good therapeutic relationship is maintained (Peterson, Becker, Treasure, Shafran & Bryant-Waugh, 2016).

Lockwood et al's (2012) findings suggest that there is a window of opportunity for weight gain at the beginning of therapy (between sessions 1-6), which is less likely to happen afterwards for those with more severe eating attitudes. Thus, an approach which does not focus on weight gain in the earlier sessions (Fairburn, 2008 - Lockwood) may not be as appropriate as an intervention which does (Waller et al., 2007). Weight suppression at pretreatment for AN should be recorded routinely as it may inform treatment planning. It may inform clinicians' decisions regarding the amount and nature of therapeutic input that is needed for this subgroup, how closely weight gain needs to be monitored and the patient's suitability for outpatient psychological therapy. In addition, patients with greater levels of anxiety may require help to overcome it in the early stages of therapy to facilitate weight gain/recovery. This can be achieved through utilising exposure and behavioural experiments to address anxiety cognitions early on. In contrast, those with low anxiety levels early in therapy may need additional motivational work to engage them and prevent dropout.

Overall, this systematic review provides evidence of how complex EDs are to treat, and how much can influence outcome/dropout. It shows how many factors need to be taken into consideration when treating AN, and how a medical model alone will

not be sufficient. There are many ways in which EDs could be explored, and it is important psychological therapies are used as part of treatment in AN, within a systems model. It is clear that outpatient therapy is crucial for enhancing therapeutic case conceptualisation and treatment planning, due to the number of psychological predictors highlighted in this review. Several factors such as OCD and depression may also need to be addressed when treating AN, not only eating pathology. What this review has shown is how important the therapeutic alliance is for people with AN, and by taking the predictors highlighted in this review into account, clinicians could increase individuals' chances of success in therapy.

5. Conclusion

Studying predictors of outcome and dropout is important for improving the effectiveness of psychological therapies for AN. The evidence suggested that there are numerous potential predictors of dropout and outpatient psychological therapy outcome for AN. Predictors include several demographic and mental health variables, duration of illness, ED-related QoL, body image, emotional avoidance, therapeutic alliance, weight variables, bodily pain and AN-subtype. However due to limited consistency between the studies with regard to methodologies and measures used, and the way results were reported, may partly explain why there was a lack of consistent predictors of treatment outcome/dropout. Therefore, it is difficult to draw firm conclusions. Future studies should prioritise the exploration of predictors and select variables that have a strong theoretical and empirical rationale. Future research should also carefully consider timing of follow-ups and consider making them longer to capture the degree of recovery, alongside using larger samples. Growth in this area will allow for stronger conclusions to be drawn about the prediction of outcome for outpatient psychological therapy for AN.

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Appendices

Appendix A: PRISMA Checklist

Appendix B: Cochrane Risk of Bias Tool

Appendix A

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	

Section/topic	#	Checklist item	Reported on page #
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome-level assessment (see Item 12).	
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group and (b) effect estimates and confidence intervals, ideally with a forest plot.	
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or	

Section/topic	#	Checklist item	Reported on page #
		subgroup analyses, meta-regression [see Item 16]).	
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., health care providers, users, and policy makers).	
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review level (e.g., incomplete retrieval of identified research, reporting bias).	
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	

Appendix B

Appendix F. Cochrane Risk of Bias Tool

Use the modified Cochrane Collaboration tool to assess risk of bias for randomized controlled trials. Bias is assessed as a judgment (high, low, or unclear) for individual elements from five domains (selection, performance, attrition, reporting, and other).

AUB KQ1 Risk of Bias Assessment (Reference ID #)

Domain	Description	High Risk of Bias	Low Risk of Bias	Unclear Risk of Bias	Reviewer Assessment	Reviewer Comments
Selection bias ***Random sequence generation***	Described the method used to generate the allocation sequence in sufficient detail to allow an assessment of whether it should produce comparable groups	Selection bias (biased allocation to interventions) due to inadequate generation of a randomized sequence	Random sequence generation method should produce comparable groups	Not described in sufficient detail	**High** **Low** **Unclear**	
Selection bias ***Allocation concealment***	Described the method used to conceal the allocation sequence in sufficient detail to determine whether intervention allocations could have been foreseen before or during enrollment	Selection bias (biased allocation to interventions) due to inadequate concealment of allocations prior to assignment	Intervention allocations likely could not have been foreseen in before or during enrollment	Not described in sufficient detail	**High** **Low** **Unclear**	
Reporting bias ***Selective reporting***	Stated how the possibility of selective outcome reporting was examined by the authors and what was found	Reporting bias due to selective outcome reporting	Selective outcome reporting bias not detected	Insufficient information to permit judgment†	**High** **Low** **Unclear**	
Other bias ***Other sources of bias***	Any important concerns about bias not addressed above*	Bias due to problems not covered elsewhere in the table	No other bias detected	There may be a risk of bias, but there is either insufficient information to assess whether an important risk of bias exists or insufficient rationale or evidence that an identified problem will introduce bias	**High** **Low** **Unclear**	

***** If particular questions/entries were pre-specified in the study's protocol, responses should be provided for each question/entry.
† It is likely that the majority of studies will fall into this category.

Assess each main or class of outcomes for each of the following. Indicate the specific outcome.

AUB KQ1 Risk of Bias Assessment (Reference ID #)

Outcome:

Domain	Description	High Risk of Bias	Low Risk of Bias	Unclear Risk of Bias	Reviewer Assessment	Reviewer Comments
Performance bias ***Blinding (participants and personnel)***	Described all measures used, if any, to blind study participants and personnel from knowledge of which intervention a participant received. Provided any information relating to whether the intended blinding was effective.	Performance bias due to knowledge of the allocated interventions by participants and personnel during the study.	Blinding was likely effective.	Not described in sufficient detail	**High** **Low** **Unclear**	
Detection bias ***Blinding (outcome assessment)***	Described all measures used, if any, to blind outcome assessors from knowledge of which intervention a participant received. Provided any information relating to whether the intended blinding was effective.	Detection bias due to knowledge of the allocated interventions by outcome assessors.	Blinding was likely effective.	Not described in sufficient detail	**High** **Low** **Unclear**	
Attrition bias ***Incomplete outcome data***	Described the completeness of outcome data for each main outcome, including attrition and exclusions from the analysis. Stated whether attrition and exclusions were reported, the numbers in each intervention group (compared with total randomized participants), reasons for attrition/exclusions where reported.	Attrition bias due to amount, nature or handling of incomplete outcome data.	Handling of incomplete outcome data was complete and unlikely to have produced bias	Insufficient reporting of attrition/exclusions to permit judgment (e.g., number randomized not stated, no reasons for missing data provided)	**High** **Low** **Unclear**	

Chapter 2: Empirical Journal Article

Evaluation of the Reliability and Validity of the English Version of the Schema Mode Inventory for Eating Disorders-Short Form for Adults with Dysfunctional Eating Behaviour

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Abstract

Background: Eating disorders (EDs) are considered one of the most difficult and serious psychiatric illnesses to treat, due to high levels of complexity, chronicity and comorbidity. Due to the high levels of psychiatric comorbidity in this population, it has been proposed that schema therapy (ST) may be especially suited to meet the needs of people with more complex eating disorders (EDs). ST works at a deeper level than maintenance factors to address the core schema-level beliefs that underpin ED psychopathology. Higher levels of early maladaptive schemas (EMS) and schema modes have been found in people with EDs, compared to non-clinical samples. To enable mode states to be measured within an ED population, the Schema Mode Inventory for eating disorders (SMI-ED) was constructed. In order to provide a shorter, more succinct version of the SMI-ED (number of questionnaire items = 190), the SMI-ED-SF (number of questionnaire items = 64) was developed.

Aims: The aim of this study was to explore the psychometric properties of the English version of the SMI-ED-SF and test how well this new, shorter measure performs. A series of statistical analyses were utilised to determine the SMI-ED-SF's concurrent validity, convergent validity, discriminant validity, incremental validity and test-retest reliability. Relationships between schema modes, ED symptoms, personality traits and childhood emotional neglect were explored in this process.

Methods: Six hundred and fifty five adults aged 16 and over with and without ED symptoms were recruited through advertisements placed on social media and various local and international not-for-profit ED organisations and support groups. Inpatient and outpatient ED services were also contacted for recruitment. Participants completed relevant psychological measures via 'Jisc Online Survey' (historically run by Joint Information Systems Committee). The survey included the SMI-ED-SF to measure schema modes, which they were asked to complete again two months later. ED symptom severity, personality traits and childhood emotional neglect were also measured. The psychometric properties of SMI-ED-SF were explored using correlational and hierarchical regression analyses.

Results: Two hundred and ninety (44%) participants self-reported an ED diagnosis. As hypothesised, there were significant relationships between schema modes on the SMI-ED-SF and personality traits and ED behaviours, showing the SMI-ED-SF had adequate concurrent and convergent validity. The schema mode variables were not correlated with height, revealing initial discriminant validity. Test-retest reliability was also strong in both clinical and healthy samples. The SMI-ED-SF explained a large amount of variance associated with ED severity, beyond that accounted for by established predictor variables (childhood neglect and personality traits), showing that the SMI-ED-SF has satisfactory incremental validity. The overall model found that the 23 predictors accounted for 56.6% of the variance in ED severity.

Discussion: This study tested the psychometric properties of the SMI-ED-SF which has broadened its utility for clinical, community and research settings. The findings represent a step forward in developing an easy-to-use, psychometrically sound instrument to identify and explore mechanisms through which schema modes are expressed by those with EDs. Developing a more precise measure of mode states within an ED population will enhance therapeutic case conceptualisation and treatment planning. This study also found that schema modes were significantly correlated with specific ED behaviours and personality traits. To enhance the effectiveness of treatment and reduce risk of relapse, people diagnosed with EDs, who have schema-level beliefs may require a treatment model that specifically addresses both eating and personality pathology, as well as childhood trauma. The new SMI-ED-SF offers patients a tool to quickly and efficiently begin to explore the early origins of underlying schema level representations in order to facilitate the development of enhanced case conceptualisation for those with EDs.

Keywords: *Psychometric properties, Schema therapy, Modes, Eating disorders, assessment, eating behaviours, personality traits, childhood neglect*

Word count: 11,058 (excluding abstracts and references)

1. Introduction

1.1 Eating Disorders and Psychological Outcomes

Eating disorders (EDs) are considered one of the most treatment-resistant and serious psychiatric illnesses, due to high levels of complexity, chronicity and comorbidity (Abbate-Daga, Amianto, Delsedime, De-Bacco & Fassino, 2013; Vitousek & Manke, 1994). The lifetime prevalence of EDs in adults is around 0.6% for anorexia nervosa (AN), 1% for bulimia nervosa (BN) and 3% for binge-eating disorder (BED) (Treasure, Claudino & Zucker, 2010). The peak age of onset is adolescence and early adulthood (Schmidt et al., 2016; Zipfel, Giel, Bulik, Hay & Schmidt, 2015). A significant number of people with EDs do not respond well to treatment, and high dropout rates have been reported (Wallier et al., 2009; Mahon, 2000). This has been linked to a range of factors, including high complexity, comorbidity, levels of ego-syntonicity, poor match to patient motivation and the treatment not being suited to the individual (Vitousek & Manke, 1994). Patients who drop out of treatment are at risk of poor prognosis and often go on to develop chronic symptoms (Strober, Freeman, & Morrell, 1997; Keller, Herzog, Lavori, Bradburn & Mahoney, 2006). EDs are often life-threatening, with AN having an extremely high mortality rate (Vitiello and Lederhendler, 2000). There are two subtypes of AN. One (binge-purge subtype) is linked to BN, which is characterized by low weight alongside bingeing and purging. The other (restrictive-subtype) is severe restriction of food and calories without bingeing/purging. The financial implications for health services

providing treatment for AN is high, due to the need for repeated episodes of hospitalisation and long-term health care (Baran, Weltzin, & Kaye, 1995).

Cognitive behavioural therapy (CBT) is widely identified as the treatment of choice for adults with EDs (Fairburn et al., 2009). There is widespread support for its efficacy but dropout rates are sometimes high (Linardon & Brannan, 2017; Agras, Fitzsimmons & Wilfley, 2017). Randomised clinical studies and "real-world" clinical trials have revealed around 50% of those with BN continue to have ED symptoms at the end of therapy (Agras, Walsh, Fairburn, Wilson & Kraemer, 2000; Poulsen et al., 2014; Waller et al., 2014). Follow-up data also imply that around one third of patients with BN still meet ED diagnostic criteria after CBT (Fairburn et al., 2009; Poulsen et al., 2014; Waller et al., 2014) and a comparable number deteriorate (Agras et al., 2000; Halmi et al., 2002). AN is particularly difficult to treat, with outcomes reporting low remission and high attrition rates (Bulik et al., 2007; Byrne, Fursland, Allen & Watson, 2011; Halmi et al., 2005; Hay, 2013).

Rigid co-morbid personality characteristics, such as perfectionism and avoidant traits, are particularly treatment-resistant (Byrne et al., 2011). These are common in EDs and often interfere with treatment engagement and efficacy. Blinder, Cumella and Sanathara (2006) discovered that 69% of an ED sample also met criteria for personality disorder, which has been shown to interfere with treatment outcomes (Masheb & Grilo, 2008; Zerwas et al., 2013). It has been suggested that poor responses to treatment may be due to insufficient attention paid to longitudinal factors associated

with ED development, alongside the existence of ingrained personality traits and schemas (Pugh, 2015; Waller et al., 2014). Research has highlighted that other therapeutic models could be developed to enrich and provide more choice in the treatment of those with more complex EDs where comorbidity, personality disorders and interpersonal dysfunction is also often part of the presentation (Jones, Leung & Harris, 2007; Wilson, Grilo & Vitousek, 2007; Cooper & Kelland, 2015).

1.2 Schema Therapy

It has been proposed that schema therapy (ST) may be helpful for those with complex EDs (Simpson et al., 2018). ST works at a deeper level than maintenance factors to address the core schema-level beliefs that underpin ED psychopathology. It has also been found effective in the treatment of other severe and enduring psychological problems with ingrained personality traits, including personality disorders (Bakos, Gallo & Wainer, 2015; Masley, Gillanders, Simpson & Taylor, 2012; Pugh, 2015; Taylor, Bee & Haddock, 2016; Hopwood & Thomas, 2014; Jacob & Arntz, 2013; Sempertegui, Karreman, Arntz & Bekker, 2012; Young, Klosko & Weishaar, 2003). Preliminary research suggests that ST may have potential in this area, with the first randomised controlled trial indicating equivalent outcomes to CBT for those with bulimic disorders (McIntosh et al., 2016; Simpson, Morrow, Vreeswijk & Reid, 2010).

The ST model is based on the concept that Early Maladaptive Schemas (EMS) develop when core emotional needs are not met in childhood (Young et al., 2003). EMS comprise of patterns of memories, cognitions, emotions and physical reactions that drive maladaptive coping mechanisms. The goal of ST for EDs is to enable core needs to be met and to change maladaptive eating habits by breaking unhelpful patterns of thinking, feeling and behaving, and replacing these with healthy coping mechanisms (Bamelis et al., 2015; Castelnuovo et al., 2017). EMS represent stable "traits", i.e. unconditional, implicit cognitive beliefs that result from the interaction of temperament, unmet core needs and repeated negative experiences with significant others during childhood (Young et al., 2003). Schema modes in contrast, are moment-to-moment emotional and behavioural "states" of a person at a given time, i.e. coping responses and parts of an individual's personality/temperament. These "states"/responses could not be fully explored by focusing on EMS alone, thus modes were developed to allow individuals to explore their coping mechanisms, learn what drives these, and find ways to change them (Young et al., 2003).

Schema modes can be clustered into four categories: (1) Innate Child Modes (emotions felt in the context of unmet needs), (2) Internalised (Parent) Modes (internalised messages received during childhood, from parents, teachers, other caregivers, culture, etc), (3) Coping Modes (survival mechanisms developed during childhood to cope with unmet emotional needs), and (4) Adaptive (Healthy) Modes (these healthy coping mechanisms are developed to help individuals find adaptive ways of meeting their emotional needs; Young et al., 2003).

1.3 Eating Disorders and Personality

Personality traits have been linked to the etiology, symptomatic expression, and maintenance of EDs (Atiye, Miettunen, & Raevuori-Helkamaa, 2015; Bardone-Cone et al., 2007; Cassin & von Ranson, 2005; Culbert, Racine, & Klump, 2015; Sansone, Levitt, & Sansone, 2005; Vitousek & Manke, 1994). Personality traits are believed to precede and contribute to ED symptoms, and often serve as predisposing factors, risk factors, or complications of an ED, whilst influencing ED course and treatment outcome (Lilenfeld, Wonderlich, Riso, Crosby, & Mitchell, 2006).

In comparison to healthy controls, the specific personality traits which have been linked to EDs, include elevated perfectionism, neuroticism, negative urgency, avoidance motivation, sensitivity to social rewards, low extraversion, and high self-directedness (Cassin & von Ranson, 2005; Farstad, McGeown & von Ranson, 2016; Fassino, Piero, Gramaglia, & Abbate-Daga, 2004; Klump et al., 2004; Krug et al., 2011). Avoidant and obsessive–compulsive PDs have the highest prevalence in ED populations (Hutsebaut, Willemsen & Van, 2018). Studies which have explored the five-factor model (FFM) dimensions of personality (Costa and McCrae's, 1992) among individuals with an ED found profiles of high neuroticism, low extraversion, low agreeableness and low conscientiousness (Ghaderi & Scott, 2000; Tasca et al., 2009; De Bolle et al., 2011). Low conscientiousness is also a well-known risk factor

for substance-related and addictive disorders; it is often associated with high impulsivity and a preference for short-term over long-term rewards (Andreassen et al., 2013). The majority of traits differ from controls in the same manner regardless of particular eating disorder, while a few traits are more strongly related to particular eating disorders, for instance high perfectionism in AN and elevated sensation-seeking in patients who binge eat (Cassin & von Ranson, 2005).

1.4 Eating Disorders and Childhood Neglect/Abuse

Several studies have reported a strong association between childhood traumatic experiences and the severity of ED symptoms (Sillanpaa, Mattila & Sumanen, 2015; Armour et al., 2016; Guillaume et al., 2016; Palmisano, Innamorati & Vanderlinden, 2016). Childhood abuse has also been linked to greater severity of the key symptoms of EDs, e.g. food restriction, 'weight, shape and food concerns' and daily functioning (Guillaume et al., 2016).

A history of childhood emotional abuse was found to be a risk factor for the development of EDs (Racine & Wildes, 2015). Several studies have suggested that early emotional neglect/abuse has the greatest effect on ED symptoms compared to other types of childhood abuse (Kent, Waller & Dagnan, 2007; Turner, Rose & Cooper, 2004; Waller, Corstorphine, & Mountford, 2007). It has been proposed that this link may be due to the impact of emotional neglect on the development of healthy

mechanisms for the regulation of emotions, and subsequent reliance on ED behaviours as an alternative mechanism for emotional regulation (Groleau, et al., 2012; Racine & Wildes, 2015; Hopwood, Ansell, Fehon & Grilo, 2011).

1.5 Eating Disorders and Schema Modes

EMS often develop as a consequence of childhood neglect/abuse, and higher levels of EMS and schema modes have been found in people with EDs, in relation to non-clinical samples (Talbot et al., 2015; Voderholzer et al, 2014). Specifically, the Eating Disorder Overcontroller (EDO) Mode appears to be strong in the ED population, and of particular relevance in the development of case conceptualisations with this population (Simpson, 2012; Simpson et al., 2016; 2018; Pietrabissa et al., 2019). The function of this mode is characterised by providing a sense of competence and control over one's eating patterns and body, with the aim of distancing oneself from underlying feelings of distress and vulnerability (Simpson, 2016). Similarly, the Helpless Surrenderer (HS) Mode has been highlighted as particularly relevant to those with EDs. In this mode, people often withdraw, protest and seek "quick-fix" solutions as a way of avoiding vulnerability.

1.6 Association between Schemas/Schema Modes, Personality, Parental Bonding, Trauma, Neglect and Abuse

According to the schema model, personality traits develop through an interaction between nature (temperament, biological predisposition) and nurture (i.e. met/unmet needs) (Young et al., 2003). Personality/schema research indicates that maladaptive EMS and coping modes are linked to high neuroticism, low extraversion, low levels of agreeableness (whilst the subjugation and self-sacrifice schemas with high agreeableness), and low conscientiousness (whilst the modes related to the unrelenting standards schema is hypothesized to be positively related to conscientiousness) (Muris, 2006; Sava, 2009; Thimm, 2010).

Research also suggests a link between negative parenting – specifically emotional abuse and invalidation – and ED symptoms, with maladaptive coping modes mediating this relationship (Brown, Selth, Stretton & Simpson, 2016; Sheffield, Waller, Emanuelli, Murray & Meyer, 2009). Studies suggest that EMS mediate the relationship between parental bonding and EDs (Turner et al., 2004). Likewise, Deas, Power, Collin, Yellowlees & Grierson (2011) found participants with AN had significantly more severe EMS (predominantly perfectionistic schemas) when they perceived their parents as less caring. Whereas adaptive schemas/schema modes are helpful and facilitate adaptive adult functioning, maladaptive coping modes, such as those found in EDs, are often activated as a means of blocking or numbing emotional pain and reducing the likelihood of further EMS activation. Thus, they often operate as self-fulfilling prophesies, further sabotaging an individual's development and capacity to get their needs met (Arntz & Bogels, 2000; Young et al., 2003).

1.7 Measuring Schema Modes: The SMI-ED-SF

The SMI-ED-SF originates from the 124-item Schema Mode Inventory (SMI) (Young et al., 2007), developed to measure schema modes through self-report. A shortened (118 item) version of the original SMI (Young et al., 2007) was validated within a sample of healthy controls, axis I and axis ll patients (Lobbestael, van Vreeswijk, Spinhoven, Schouten, & Arntz, 2010) and found to have acceptable internal consistency and test-rest reliability. A 14-factor model emerged, consisting of: five child modes, five dysfunctional coping modes, two dysfunctional parent modes and the adaptive Healthy Adult mode. The SMI was primarily developed to measure schema modes in the Borderline and Antisocial PDs, however, it has recently successfully been adapted (SMI-2) to more appropriately measure schema modes as they manifest within Cluster C and paranoid, histrionic and narcissistic PDs (Bamelis, Renner, Heidkamp, & Arntz, 2011). Previous studies have highlighted the need for exploratory research that examines schema modes within specific clinical groups in order to begin to delineate the profiles and new sub-modes that may be identified in these populations (Lobbestael et al., 2010).

To enable mode states to be measured within an ED population, the schema mode inventory for eating disorders (SMI-ED) was developed through combining items from the original SMI (Young et al., 2007), with a set of additional items. New items included a set of statements relating to the 'Overcontroller mode', due to recent indications that this may be a central coping mode amongst ED sufferers (Brown et

al., 2016). A set of additional items were also generated by clinicians/researchers specializing in the treatment of eating disorders. Items were generated based on clinical experience of the typical self-statements made by patients across all diagnostic groups. Four patients from the UK (two with a diagnosis of AN, one with BED and one with BN) also piloted the questionnaire and contributed by further suggesting items that were relevant to their most commonly experienced emotional and coping states. Through a screening process highly similar items were identified; those items most representative of the ED population under consideration were retained and any redundant questions removed. This resulted in a 190-item SMI-ED that reflected statements that people might use to describe themselves. Preliminary research indicated adequate validity and reliability of this measure (Simpson et al., 2018). The SMI-ED revealed acceptable internal consistency, with Cronbach's alpha coefficients ranging from 0.807 (Det. SS) to 0.976 (PM) across subscales ($mean_{\alpha\text{-factors}} = 0.914$; $SD_{\alpha\text{-factors}} = 0.048$).

However, due to the large number of items in the SMI-ED (number of items = 190), a shortened version of the SMI-ED (i.e. the SMI-ED-SF) was constructed. The item-pool (64 items) for the new SMI-ED-SF was first created in Scotland, United Kingdom, independently by two clinicians/researchers specialized both in schema therapy and in the treatment of ED. They listed the items under each of the 16 modes in order of relevance in observance of the ST conceptualization for EDs.

Simultaneously, and blinded from the other authors, a third researcher (not specialized in ST) identified those items showing higher factor loading for each dimension of the original SMI-ED (190 items). Conclusions from the authors were matched and discussed until agreement on the final set of items for the SMI-ED-SF was reached. Four items (three general, and one ED-specific statement - where applicable) per mode were retained to overcome the limitation of the previous version of the tool, where the number of items was highly heterogeneous between modes.

Contrary to its full-length version, in which the number of items between scales varies from 5 (DS) to 20 (VC), a fixed list of four statements was ensured for each of the SMI-ED-SF subscales (n = 16). Specifically, except for those modes only including either items retrieved from the original SMI or consisting of EDs-specific statements, the remaining subscales comprised three general statements and one item representative of the ED population. Consistent with the previous versions of the tool, items were scored on a six-point Likert scale ranging from 0 ("never or hardly ever") to 5 ("all of the time") and the score for each mode was computed dividing the sum scores by the number of items in each subscale. The higher the score, the more frequent were the manifestations of the modes. A confirmatory factor analysis and psychometric properties of the Italian SMI-ED-SF, based on an Italian eating disordered population, has been published (Pietrabissa et al., 2019). This publication shows that the Italian version of the SMI-ED-SF represents a reliable and valid alternative to the long-form SMI-ED for assessment and conceptualization of schema

modes in Italian adults with disordered eating habits. This is a sister project which links to a larger research project, linked to the above Italian study.

1.8 Aims of Present Study

1. Explore the psychometric properties of the English version of the SMI-ED-SF by investigating:
    a. Concurrent validity (two tests which are thought to measure the same construct are highly correlated) by using Pearson's correlation.
    b. Convergent validity (two tests which measure related but distinct constructs are correlated) by using Pearson's correlation.
    c. Discriminant validity (concepts/measurements that are not supposed to be related should be proven to be unrelated) by using Pearson's correlation.
    d. Test-retest reliability (the stability and reliability of an instrument over time) using Pearson's correlations between SMI-ED-SF scores at baseline and 4 weeks later.
    e. Incremental validity (if a measure's predictor ability explains what it is trying to measure beyond other predictors) using hierarchical linear regression.
2. Explore the relationship between schema modes, ED symptoms, personality traits and childhood emotional neglect.

For concurrent validity, it was hypothesized that all SMI-ED-SF scales would be positively associated with neuroticism and negatively correlated with the other four personality traits, and the opposite for the happy child and healthy adult modes (Cassin & von Ranson, 2005). For convergent validity, it was hypothesised that certain coping modes will be significantly correlated with certain ED behaviours (Talbot et al., 2015; Voderholzer et al, 2014). For example, binge-eating behaviours are predicted to correlate strongly with the Detatched Self-Soother mode. The Impulsive Child mode is also hypothesised to correlate with binge-eating as a means of impulsive self-soothing. In addition, restriction, over-exercising and purging behaviours are predicted to positively correlate with the EDO mode on the SMI-ED-SF.

Given that personality traits and emotional neglect have been shown to be strong predictors of ED symptoms, these factors were used to explore incremental validity. It is hypothesized that the SMI-ED-SF will have incremental validity in predicting ED severity above and beyond emotional neglect and the five personality dimensions.

2. Method

2.1 Study Design

This study employed a cross-sectional, quantitative, correlational and regressional design to look at the link between schema modes, personality traits and childhood neglect. Correlations were also explored between schema modes and ED variables (i.e. fear of weight gain, overvaluation of weight and shape, and binge-eating, compulsive and compensatory behaviours) and between SMI-ED-SF factors and height.

2.2 Ethical Approval

This study was approved by the North of Scotland Research Ethics Committee (REC reference: 18/NS/0046; IRAS project ID: 241811). It also received Research and Development Approval from each NHS health board in Scotland, UK. Please see Appendix A for confirmation of ethical approval.

2.3 Participants

This study recruited adults who have eating disorder symptomatology, alongside healthy adults. The study was therefore open to individuals (1) aged 16

years and over, (2) who were English-speaking and (3) provided digital informed consent to participate in the study. Participants were excluded if they did not have capacity to consent to the research, e.g. due to visual or cognitive impairments and if their comprehension of the English language was insufficient for them to understand and complete the questionnaires.

2.4 Procedure

Participants were recruited between August 2018 and March 2019 through advertisements placed on Twitter, Facebook and various local and international not-for-profit eating disorder organisations and support groups. Websites that advertised the study included BEAT, the United Kingdom's leading charity for eating disorders, as well as various national eating disorders charities, including The Butterfly Foundation, National Eating Disorders Association (NEDA) and Eating Disorders Victoria. Eating disorder and weight management services within NHS Scotland were also provided with the study protocol and recruitment posters (Appendices B & C). Clinicians were encouraged to identify individuals on their current caseload that met inclusion criteria for an ED and posters were placed within service waiting rooms to help direct potential participants to the online study. Healthy controls were recruited via social media and within the School of Health and Social Science at the University of Edinburgh, where advertisements were sent out via online email system. Participation was voluntary and as compensation for time spent taking part,

participants were offered the opportunity to enter a prize draw to win a £100 gift voucher.

This study was completed via the JISC Online Survey. Once online, participants were directed to an information sheet, detailing the purpose of the study and participant rights, and a consent form (Appendices D & E). They were also asked to provide an email address to (1) be contacted 1-2 months later to complete one questionnaire again and (2) be included in the prize draw. Those who provided an email address were then emailed 1-2 months after they completed the first half of the study in order to invite them to complete the questionnaire a second time. The email addresses were kept separate from the questionnaire responses for anonymity.

2.5 Measures

Data was collected through several online self-report measures (Appendices F-J) as detailed below:

Demographics Information including age, gender, education, nationality, relationships and employment status were collected.

Biomedical data Participants reported their height and weight, then were asked to report on any prior or current eating disorder diagnosis. Participants were also asked about current and past consultation with mental health services.

The Eating Disorder Diagnostic Scale (EDDS; American Psychiatric Association, 2013). The EDDS is a 22-item self-report scale, developed to aid diagnosis and measure severity of eating disorders as defined by the DSM-5 (AN, BN, BED, atypical AN, low frequency BN, low frequency BED, purging disorder and night eating syndrome). The EDDS has demonstrated temporal reliability (mean k = 0.80) and criterion validity (mean k = 0.83). The overall symptom composite also demonstrated good test-retest reliability (r = 0.87), internal consistency (mean a = 0.89) and convergent validity with existing ED questionnaires (Stice, Telch & Rizvi, 2000). This scale has good reliability and validity and is designed for use in both clinical and research settings (Stice et al., 2000). It has also been validated against the gold standard Eating Disorder Examination Questionnaire (EDE-Q) and found to provide reliable diagnoses for diagnostic purposes (Stice, Fisher & Martinez, 2004). An overall symptom composite cut-off score of 16.5 on the EDDS accurately distinguishes clinical patients from healthy controls (Krabbenborg, Danner, Larsen & Van Der Veer., 2012). In this study, those with a mean score of less than 16.5 on the EDDS and an absence of ED behaviours (restriction, bingeing and/or purging) are classed as "not having an eating disorder/healthy". The current study used this diagnostic measure to explore each ED diagnostic group represented within the sample, something that was not possible in Simpson et al.'s (2018) study.

The Schema Mode Inventory for Eating Disorders-short form (Simpson et al., 2018; Pietrabissa et al., 2019). The new 64-item (shortened) version of the original

190-item SMI-ED was developed to measure schema modes as specifically applied to eating disorders. The SMI-ED (long version) was created independently by two clinicians/researchers specialised both in schema therapy and in the treatment of ED. A third researcher was blinded from the other authors and identified the items showing higher factor loading of each dimension. Deductions by the authors were discussed until agreement was reached about the final set of items for the SMI-ED (Simpson et al., 2018). The shortened version (SMI-ED-SF) was developed through selecting four items from the original SMI and one new item per mode (with the highest factor loading on the SMI-ED). The new modes, eating disorder over-controller (EDO) and helpless surrenderer (HS) were chosen on the basis of the five items with the highest factor loading in the SMI-ED study (Simpson et al., 2018).

More specifically, the SMI-ED-SF consists of 16 different modes based on four items per factor. Three of the items for each factor originated from the 190-item SMI-ED, and one of the items on each subscale is a new ED-specific item. The 16 modes are clustered thematically into 'child', 'internalised parent', 'coping' and 'healthy' modes or 'sides' of self. The SMI-ED-SF consists of: (A) five innate child modes (1. vulnerable child-VC, 2. angry child-AC, 3. enraged child-EC, 4. impulsive child-IC, 5. undiscliplined child-UC); (B) two internalised maladaptive modes (6. punitive mode-PM and 7. demanding mode-DM); (C) seven maladaptive coping modes (8. compliant surrenderer-CS, 9. helpless surrenderer-HS, 10. detached protector-Det.P, 11. detached self-soother-Det.SS, 12. self-aggrandizer-SA, 13. bully and attack-BA, 14. eating disorder overcontroller-EDO); and (D) two healthy factors (15. happy child-

HC and 16. healthy adult-HA). Two modes (IC and EC) include items solely from the original version of the SMI while the HS and EDO modes comprise entirely of new ED-specific statements.

Items are scored on a six-point Likert scale ranging from 0 ("never or almost never") to 5 ("always") and the score for each mode is computed using the means of each mode (dividing the sum score by the number of items in each subscale). The higher the score, the more frequent the manifestations of the modes. The original SMI-ED showed acceptable internal consistency with Cronbach's alpha coefficients ranging from 0.807 (Det.SS) to 0.976 (PM) across subscales (mean = 0.914, SD = 0.048; Pietrabissa et al, 2019).

The Big Five Inventory (BFI; John & Srivastava, 1999). The BFI is a 44-item inventory that measures the Big Five Factors (dimensions) of personality; 1. extraversion, 2. agreeableness, 3. conscientiousness, 4. neuroticism, 5. openness (Goldberg, 1993). Each of the factors is then further divided into personality facets. Fossati et al. (2011) found the internal consistency reliabilities and all test-retest correlations were greater than 0.75 for all five BFI scales. The BFI scales also showed adequate convergent-discriminant validity coefficients. These findings suggest that the BFI provides satisfactory reliability and validity data. Items on the BFI are scored on a five-point Likert scale, ranging from 1 ("disagree strongly") to 5 ("agree strongly").

Childhood Experience of Care and Abuse Questionnaire (CECA.Q; Bifulco, Bernazzani, Moran & Jacobs, 2005). A self-report questionnaire (CECA.Q) was developed to mirror an existing validated interview measure: the childhood experience of care and abuse (CECA). The questionnaire assesses lack of parental care (neglect and antipathy), parental physical abuse, and sexual abuse from any adult before the age of 17. The CECA.Q shows satisfactory reliability and validity as a self-report measure for adverse childhood experience. Satisfactory internal scale consistency was achieved on the CECA.Q for antipathy (alpha = 0.81) and neglect (alpha = 0.80) scales. There was satisfactory test-retest for both care and abuse scales. Significant associations were found between CECA.Q scales and the parallel interview scales with cut-offs determined for high sensitivity and specificity, e.g. cut offs were set at ≥22 for neglect from mother and ≥ 24 for neglect by father (Bifulco et al., 2005).

2.6 Sample Size Calculation

Correlation and regression were the main analytic strategies utilised. For correlations, Cohen (1992) recommends a minimum sample of 84 people to detect moderate correlations or larger at an alpha of 0.05 with 80% power. Given the high number of correlations being performed in this study, the significance of *p* was adjusted to reduce the type 1 error rate. In this case Cohen suggests a *p* of <0.01, therefore 125 participants were needed to detect medium sized effects or larger. Type 1 error was also reduced by setting a limit for the overall value of *r*. With a large sample, very small correlations can be statistically significant, but clinically

meaningless. Thus, only r values above 0.25 with a p of <0.01 were treated as significant. This is what Cohen (1992) describes as a 'weak but noticeable effect'.

Green (1991) recommends that a sample size of 104 + n, where n is the number of independent variables will provide 80% power to detect medium effect sizes and larger, at an alpha of less than 0.05. Thus, if there are 23 predictors (16 from the SMI-ED-SF, five from the BFI and two from the CECA), the sample size needed is 127. Green (1991) also states that studies need $50 + 8m_{predictors}$ to detect the overall significance of the regression. Based on this sample size calculation, the incremental validity analyses required a minimum sample size of 234.

2.7 Statistical Analysis

2.7.1 Concurrent validity

Concurrent validity was assessed using Pearson's correlation. To establish concurrent validity, two tests which are thought to measure the same construct should be highly correlated, i.e. factors which are theoretically related to the SMI-ED-SF are shown to be statistically related. Schemas and schema modes are closely linked to personality traits and states, thus the BFI personality measure was chosen to explore concurrent validity.

2.7.2 Convergent validity

To establish convergent validity, two tests are expected to significantly correlate if they measure related but distinct constructs. ED schema modes are considered to be a distinct but related construct to ED pathology, i.e. EDDS variables. Based on previous research (Talbot et al., 2015; Voderholzer et al., 2014), it was anticipated that moderate to large associations would be observed between EDDS and SMI-ED-SF variables. Correlations were explored between the 16 SMI-ED-SF modes and ED variables, i.e. fear of weight gain, overvaluation of weight and shape, and binge-eating, compulsive and compensatory behaviours.

2.7.3 Discriminant validity

To determine discriminant validity, concepts/measurements that are not supposed to be related should be proven to be unrelated. A correlation was carried out between SMI-ED-SF factors and height, two factors that are theoretically unrelated, in order to determine discriminant validity.

2.7.4 Test-retest reliability

To measure the stability and reliability of the instrument over time, correlations between SMI-ED-SF scores at baseline and 4 weeks later (retest) were used to calculate test-retest reliability. To ensure a true reflection of test re-test reliability,

participants were required to be stable and untreated. Two questions asking if participants had seen a mental health professional (MHP) were included. Test re-test reliability was also calculated for control participants.

2.7.5 Incremental validity

Incremental validity was assessed using hierarchical linear regression to find out if the SMI-ED-SF's predictor ability could explain ED symptoms beyond other predictors. One important outcome in this population is ED severity (i.e. EDDS total symptom composite). In line with evidence-based research, it is assumed that childhood neglect would predict higher severity of ED symptoms alongside certain personality traits, e.g. neuroticism. Overall, if childhood neglect and the personality traits are entered into a hierarchical linear regression, it should remove from the DV (symptom composite) the variance that is associated with these known (well established) predictors. If the schema modes are then added in one block it should tell us if the SMI-ED-SF adds unique explanatory variance in predicting symptom severity, over and above the known predictors.

2.8 Preparation of Data for Analysis

2.8.1 Missing Data

No missing data was detected for most questionnaires as JISC survey was set up so

that responses were mandatory. Investigation of the output revealed very little missing data (the largest item for missing data was weight which had 0.5% of missing data, followed by age which had 0.3% of missing data). On these two variables where data was missing, there were no clear patterns to the missing data, which was confirmed by Little's MCAR test being non-significant, suggesting that the data was missing completely at random; $X^2=3.391_{(df=2)}$, p=0.183. Following this, missing data was imputed using the expectation maximisation method as this has been shown to be appropriate with data that is missing at random (Enders, 2011).

2.8.2 Assumptions

Item analysis revealed a non-perfect normal distribution, with Kolmogorov-Smirnov and Shapiro-Wilk tests being significant ($p < 0.001$). Skewness ranged between -0.480 and 2.60 ($mean_{sk} = 0.52$, $SD_{sk} = 1.02$), and kurtosis ranged between -1.34 and 7.22 ($mean_{k} = 2.11$, $SD_{k} = 1.91$).

3. Results

3.1 Sample Characteristics

The sample comprised 655 participants aged from 16 to 79 years (mean = 31.94, SD = 11.05). The majority of the sample reported that their country of permanent residence was the United Kingdom (80.3%), and 91.6% of the total sample spoke English as their first language. The sample BMI ranged from 11.98 to 88.24 (mean = 24.39, SD = 8.4). Of the total sample, 290 (44.3%) selected "yes" to having received an ED diagnosis; of these, 190 (65.5%) reported they had been diagnosed with AN, 56 (19.3%) with Bulimia Nervosa, 19 (6.6%) with Binge Eating Disorder, and 22 (7.6%) with EDNOS (Eating Disorder Not Otherwise Specified). The remaining 365 (55.7%) participants reported that they had not received a formal diagnosis. Participants' self-reported perception of having received an ED diagnosis was different from the EDDS findings; of the 283 participants who met full criteria for an ED diagnosis on the EDDS, only 192 of these self-reported receiving an ED diagnosis. It is possible they were aware of having ED symptoms but had simply not received a diagnosis, or were completely unaware they met criteria for an ED. Descriptive statistics are presented in Table 1.

Table 1: Baseline participant characteristics (mean; SD)

Demographic variables	**Overall sample (n=655)**		**[35]AN (n=102)**		**Atypical AN (n=47)**		**BN (n=82)**		**Purging disorder (n=7)**		**BED (n=23)**		**Low frequency BED (n=4)**		**Night eating syndrome (n=18)**		**Healthy sample (n=372)**	
Weight in kg (mean; SD)	68.37	24.24	45.27	5.65	70.02	23.60	80.66	27.14	81.14	34.88	110.27	44.77	90.05	23.59	79.34	25.66	68.19	17.90
Height in m (mean; SD)	1.67	0.08	1.65	0.07	1.67	0.09	1.66	0.08	1.65	0.07	1.70	0.08	1.71	0.06	1.66	0.07	1.68	0.08
BMI (mean; SD)	24.39	8.4	16.50	1.54	25.16	8.10	29.22	9.52	29.88	13.18	38.40	16.16	30.84	7.27	28.71	9.14	24.14	6.06
Age (mean; SD)	31.94	11.05	26.37	8.69	32.94	10.97	32.06	12.87	30.00	14.06	38.35	11.26	35.25	9.91	32.00	11.77	32.92	10.65
Gender (n; %)																		
Male	74	11.3%	4	3.9%	2	4.3%	4	4.9%	0	0%	1	4.3%	0	0%	2	11.1%	61	16.4%
Female	581	88.7%	98	96.1%	45	95.7%	78	95.1%	7	100%	22	95.7%	4	100%	16	88.9%	311	83.6%
Relationship-status (n; %)																		
Single	342	52.2%	75	73.5%	23	48.9%	50	61.0%	4	57.1%	8	34.8%	2	50.0%	7	38.9%	173	46.5%
[36]In a de facto relationship	280	42.7%	21	20.6%	22	46.8%	26	31.7%	3	42.9%	12	52.2%	2	50.0%	9	50.0%	185	49.7%
Separated/ divorced	26	4%	4	3.9%	2	4.3%	4	4.9%	0	0%	3	13.0%	0	0%	2	11.1%	11	3.0%
Widowed	2	0.3%	0	0%	0	0%	2	2.4%	0	0%	0	0%	0	0%	0	0%	0	0%
Preferred not to say	5	0.8%	2	2%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	3	0.8%

[35] Diagnoses based on EDDS [2] Married, civil partnership or cohabiting
AN Anorexia Nervosa, *BN* bulimia nervosa, *BED* binge-eating disorder, *MHP* mental health professional

Highest education status (n; %)																		
Primary school	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Secondary/ high school	39	6%	9	8.8%	4	8.5%	5	6.1%	1	14.3%	3	13.0%	0	0%	4	22.2%	13	3.5%
College	107	16.3%	34	33.3%	6	12.8%	20	24.4%	1	14.3%	6	26.1%	0	0%	4	22.2%	36	9.7%
University degree/ Masters/ Doctorate	491	75%	55	53.9%	36	76.6%	55	67.1%	5	71.4%	13	56.5%	4	100%	10	55.6%	313	84.1%
Other	13	2%	2	2%	1	2.1%	2	2.4%	0	0%	1	4.3%	0	0%	0	0%	7	1.9%
Prefer not to say	5	0.8%	2	2%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	3	0.8%
Employment status (n; %)																		
Student	172	26.2%	38	37.3%	14	29.8%	24	29.3%	3	42.9%	8	34.8%	0	0%	5	27.8%	80	21.5%
Employed full-time	256	39.1%	26	25.5%	18	38.3%	23	28.0%	2	28.6%	10	43.5%	2	50.0%	7	38.9%	168	45.2%
Employed part-time	106	16.2%	14	13.7%	8	17.0%	16	19.5%	1	14.3%	3	13.0%	2	50.0%	3	16.7%	59	15.9%
Self-employed	54	8.2%	4	3.9%	2	4.3%	8	9.8%	0	0%	1	4.3%	0	0%	1	5.6%	38	10.2%
Unemployed	36	5.5%	17	16.7%	2	4.3%	5	6.1%	0	0%	0	0%	0	0%	1	5.6%	11	3.0%
Retired	10	1.5%	0	0%	0	0%	2	2.4%	0	0%	0	0%	0	0%	0	0%	8	2.2%
Other	21	3.2%	3	2.9%	3	6.4%	4	4.9%	1	14.3%	1	4.3%	0	0%	1	5.6%	8	2.2%
MHP involvement																		
Currently seeing	232	35.4%	71	69.6%	21	44.7%	37	45.1%	4	57.1%	9	39.1%	0	0%	8	44.4%	82	22.0%
Seen in past year	124	18.9%	17	16.7%	8	17.0%	21	25.6%	1	14.3%	3	13.0%	1	25.5%	1	5.6%	72	19.4%
Prefer not to say	2	0.3%	0	0%	1	2.1%	1	1.2%	0	0%	0	0%	0	0%	0	0%	0	0%
No involvement	297	45.3%	14	13.7%	17	36.2%	23	28.0%	2	28.6%	11	47.8%	3	75.0%	9	50.0%	218	58.6%

Self-reported ED diagnosis																	
Yes	290	44.3%	93	91.2%	28	59.6%	51	62.2%	5	71.4%	6	26.1%	1	25.0%	8	44.4%	98	26.3%
No	365	55.7%	9	8.8%	19	40.4%	31	37.8%	2	28.6%	17	73.9%	3	75.0%	10	55.6%	274	73.7%

3.2. Correlational Analyses

Correlational analyses were conducted to explore the relationships between the SMI-ED-SF and other questionnaire variables to measure concurrent and convergent validity, and test-retest reliability.

3.2.1. Concurrent Validity: Correlation between SMI-ED-SF and the Big Five Personality traits

All SMI-ED-SF variables were significantly associated with neuroticism apart from the bully-attack mode (Table 2). Correlations ranged from medium ($r = 0.360$, $p<0.01$; undisciplined child) to large ($r = 0.675$, $p<0.01$; vulnerable child). The adaptive modes (happy child and healthy adult) were negatively correlated with neuroticism while the other modes were positively correlated with it. The bully-attack mode was statistically significant, but was considered to not be clinically important, due to a value of *r* being less than 0.25.

Table 2: Correlations between SMI-ED-SF modes and the BFI's Big Five Personality traits

Schema modes	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness
Vulnerable Child	0.675**	-0.419**	-0.140	-0.207	-0.214
Angry Child	0.485**	-0.252**	0.005	-0.332**	-0.198
Enraged Child	0.382**	-0.149	-0.037	-0.363**	-0.199
Impulsive Child	0.372**	-0.068	-0.092	-0.359**	-0.376**
Undisciplined Child	0.360**	-0.174	-0.146	-0.163	-0.533**
Happy Child	-0.645**	0.464**	0.207	0.274**	0.247
Punitive Mode	0.544**	-0.297**	-0.132	-0.163	0.020
Demanding Mode	0.527**	-0.258**	-0.120	-0.161	0.070
Healthy Adult	-0.666**	0.494**	0.299**	0.256**	0.272**
Compliant Surrenderer	0.515**	-0.417**	-0.139	0.069	-0.187
Detached Protector	0.562**	-0.535**	-0.168	-0.313**	-0.228
Detached Self-Soother	0.579**	-0.301**	-0.124	-0.169	-0.147
Self-Aggrandizer	0.389**	-0.138	-0.050	-0.522**	-0.155
Bully-Attack	0.206	-0.060	0.035	-0.464**	-0.145
Helpless Surrenderer	0.608**	-0.324**	-0.131	-0.273**	-0.283**
Eating Disorder Overcontroller	0.462**	-0.242	-0.113	-0.132	-0.114

** Correlation is significant at the 0.01 level (2-tailed) and r is above 0.25

Ten SMI-ED-SF variables were significantly associated with extraversion. Significant associations ranged from small (r = -0.252, p <0.01; angry child) to medium (r = 0.494, p<0.01; healthy adult). The adaptive modes (happy child and healthy adult) were positively correlated with extraversion while the other modes were negatively correlated. Six schema modes did not highly correlate with extraversion (enraged child, impulsive child, undisciplined child, self-aggrandiser, bully-attack, eating disorder overcontroller). The bully-attack mode was the only mode not statistically significantly correlated with extraversion at the p<0.01 level. All other modes were statistically significant, but were considered to not be clinically important, due to a value of *r* being less than 0.25.

Happy adult mode was significantly (but weakly) associated with openness (r = 0.299, p<0.01). The angry child, enraged child and bully-attack modes were not significantly correlated with conscientiousness at the p<0.01 level. All other modes were statistically significant, but were considered to not be clinically important, due to a value of *r* being less than 0.25.

Nine SMI-ED-SF variables were significantly associated with agreeableness. Significant associations ranged from small (r = -0.256, p<0.01; healthy adult) to large (r = -0.522, p<0.01; self-aggrandizer). The adaptive modes (happy child and healthy adult) were positively correlated with agreeableness while the other modes were negatively correlated. The compliant surrenderer mode was the only mode not significantly correlated with agreeableness at the p<0.01 level. All other modes were

statistically significant, but were considered to not be clinically important, due to a value of *r* being less than 0.25.

Four SMI-ED-SF variables were significantly associated with conscientiousness. Significant associations ranged from small ($r = -0.272$, $p<0.01$; healthy adult) to large ($r = -0.533$, $p<0.01$; undisciplined child). The adaptive modes (happy child and healthy adult) were positively correlated with conscientiousness while the other modes were negatively correlated. The punitive and demanding modes were the only modes not statistically significantly correlated with conscientiousness at the $p<0.01$ level. The other modes were statistically significant, but were considered to not be clinically important, due to a value of *r* being less than 0.25.

3.2.2 Convergent Validity: Correlation between SMI-ED-SF and eating disorder variables

Convergent validity analyses can be seen in Table 3.

Table 3: Correlations between SMI-ED-SF modes and EDDS variables

Schema modes	Fear of weight gain	Over-evaluation of weight & shape	Binge-eating behaviours	Compulsive behaviours (fasting & over exercise)	Compensatory Purging (vomiting & laxative use)
Vulnerable Child	0.494**	0.500**	0.280**	0.547**	0.397**
Angry Child	0.318**	0.342**	0.299**	0.334**	0.278**
Enraged Child	0.161	0.206	0.198	0.179	0.123
Impulsive Child	0.243	0.254**	0.318**	0.261**	0.257**
Undisciplined Child	0.249	0.274**	0.327**	0.199	0.189
Happy Child	-0.396**	-0.417**	-0.214	-0.414**	-0.292**
Punitive Mode	0.473**	0.474**	0.119	0.598**	0.368**
Demanding Mode	0.477**	0.482**	0.117	0.550**	0.325**
Healthy Adult	-0.385**	-0.452**	-0.161	-0.459**	-0.302**
Compliant Surrenderer	0.357**	0.376**	0.210	0.409**	0.296**
Detached Protector	0.365**	0.374**	0.223	0.468**	0.343**
Detached Self-Soother	0.472**	0.481**	0.302**	0.572**	0.377**
Self-Aggrandizer	0.329**	0.344**	0.172	0.325**	0.218
Bully-Attack	0.171	0.220	0.148	0.207	0.193
Helpless Surrenderer	0.378**	0.396**	0.228	0.392**	0.240
Eating Disorder Overcontroller	0.496**	0.451**	0.223	0.612**	0.442**

** Correlation is significant at the 0.01 level (2-tailed) and r is above 0.25

Note: 'Fear of weight gain' is based on EDDS Q 2 'over-evaluation of weight and shape' is based on EDDS Q 3, 'binge-eating behaviours' are based on EDDS Qs 4-6, 'compulsive behaviours' are based on EDDS Qs 15-16 and 'compensatory purging' is based on EDDS Qs 13-14.

Twelve SMI-ED-SF variables were significantly associated with fear of weight gain. Significant associations ranged from medium ($r = 0.357$, $p<0.01$; compliant surrenderer) to medium-large ($r = 0.496$, $p<0.01$; eating disorder overcontroller). Four schema modes were statistically significant, but were considered to not be clinically associated with fear of weight gain, due to a value of *r* being less than 0.25.

Fourteen SMI-ED-SF variables were significantly associated with over-evaluation of weight and shape. Significant associations ranged from small ($r = 0.254$, $p<0.01$; impulsive child) to large ($r = 0.500$, $p<0.01$; vulnerable child). Two schema modes were statistically significant (enraged child and bully-attack), but were considered to not be clinically associated with over-evaluation of weight and shape, due to a value of *r* being less than 0.25.

Five SMI-ED-SF variables were significantly associated with binge-eating behaviours. Significant associations ranged from small ($r = 0.280$, $p<0.01$; vulnerable child) to medium ($r = 0.327$, $p<0.01$; undisciplined child). All other modes were statistically significant, but were considered to not be clinically important with regard to their relationship with binge-eating, due to a value of *r* being less than 0.25.

Thirteen SMI-ED-SF variables were significantly associated with compulsive behaviours (fasting and over-exercise). Significant associations ranged from small ($r = 0.261$, $p<0.01$; impulsive child) to large ($r = 0.612$, $p<0.01$; eating disorder

overcontroller). Three schema modes did not strongly correlate with compulsive behaviours (EC, UC, BA). These were significant at the $p<0.01$ level but classed as clinically insignificant due to a value of *r* being less than 0.25.

Eleven SMI-ED-SF variables were significantly associated with compensatory purging (vomiting and laxative use). Significant associations ranged from small ($r = 0.257$, $p<0.01$; impulsive child) to medium ($r = 0.442$, $p<0.01$; eating disorder overcontroller). Five schema modes did not strongly correlate with compensatory purging (EC, UC, SA, BA, HS). These were significant at the $p<0.01$ level but classed as clinically insignificant due to a value of *r* being less than 0.25.

Consistent with the original SMI-ED, the adaptive modes (happy child and healthy adult) were negatively correlated with the ED variables while the maladaptive coping modes were positively correlated with ED behaviours.

3.2.3 Discriminant Validity: : Correlation between SMI-ED-SF and height

As expected, none of the SMI-ED-SF factors were significantly associated with height (Table 4).

Table 4: Correlations between SMI-ED-SF subscales and height

Schema modes	Height
Vulnerable Child	-0.177
Angry Child	-0.069
Enraged Child	-0.068
Impulsive Child	-0.030
Undisciplined Child	-0.092
Healthy Child	0.114
Punitive Mode	-0.145
Demanding Mode	-0.128
Healthy Adult	0.154
Compliant Surrenderer	-0.090
Detached Protector	-0.075
Detached Self-Soother	-0.116
Self-Aggrandizer	-0.036
Bully-Attack	0.005
Helpless Surrenderer	-0.127
Eating Disorder Overcontroller	-0.141

** Correlation is significant at the 0.01 level (2-tailed) and r is above 0.25

2.2.4 Test-retest reliability: Correlation between SMI-ED-SF modes at T1 and T2

Of the total sample, 563 participants left an email address and were asked to complete the SMI-ED-SF again. Three hundred and ninety five participants completed the SMI-ED-SF again four weeks later (retest). Two hundred and thirty four of these participants were included in the test-retest analysis, based on those who self-reported that they had *not* received an ED diagnosis by a mental health professional, and those who were diagnosed with an ED but reported that they were not currently/had not seen

a mental health professional in the past year. Three separate analyses were carried out with (1) the healthy controls (n=201), i.e. those who self-reported no ED diagnosis, (2) ED participants (n=33), i.e. those who self-reported an ED diagnosis and (3) both healthy controls and ED participants together (based on self-reported ED diagnosis) to confirm test-retest reliability in both healthy and clinical samples. The data analysis found strong, significant positive correlations between participants' schema mode scores at testing times one and two in all three groups. Test-retest of the separate modes ranged from moderate ($r = 0.560$; bully and attack mode) to strong ($r = 0.810$; detached protector mode; p's<0.01) within the mixed group. They ranged from weak ($r = 0.402$; bully-attack mode) to strong ($r = 0.836$; compliant surrenderer mode; p's<0.01) in the ED group. Correlations ranged moderate ($r = 0.615$; enraged child mode) to strong ($r = 0.859$; punitive mode, p's<0.01) in the healthy sample. The results can be seen in Table 5.

Table 5: Test-Retest Reliability – correlations between schema modes at T1 and T2

	Healthy controls mixed with ED participants who had not consulted a MHP (n=234)	**ED participants who had not consulted a MHP (n=33)**	**Healthy control sample (n=201)**
Schema Modes	*r*		
Vulnerable Child	0.750**	0.728**	0.796**
Angry Child	0.683**	0.467**	0.746**
Enraged Child	0.657**	0.748**	0.615**
Impulsive Child	0.675**	0.502**	0.670**
Undisciplined Child	0.681**	0.706**	0.693**
Happy Child	0.715**	0.799**	0.789**
Punitive Mode	0.783**	0.701**	0.859**
Demanding Mode	0.729**	0.801**	0.763**
Happy Adult	0.742**	0.694**	0.789**
Compliant Surrenderer	0.721**	0.836**	0.786**
Detached Protector	0.810**	0.802**	0.837**
Detached Self-Soother	0.718**	0.762**	0.754**
Self-Aggrandizer	0.719**	0.817**	0.725**
Bully-Attack	0.560**	0.402**	0.623**
Helpless Surrenderer	0.711**	0.579**	0.734**
Eating Disorder Overcontroller	0.799**	0.778**	0.853**
Mean test-retest value for all modes	0.716**	0.695**	0.752**

**Correlation is significant at the 0.01 level (2-tailed)

3.3 Multivariate Analysis

3.3.1 Incremental Validity

Hierarchical multiple regression analysis was conducted to determine predictors of eating disorder severity with CECA-Q (childhood neglect by both mother and father) entered into the model at step 1. At step 2, the Big Five Inventory subscales; extraversion, agreeableness, conscientiousness, neuroticism and openness were entered. At step 3, the 16 SMI-ED-SF subscales were added into the model. The results are presented in Table 6.

Table 6: Incremental Validity - hierarchical multiple regression for the prediction of eating disorder severity on the EDDS

Model	$\boldsymbol{\beta}$	*t*	*p*	$\boldsymbol{R^2}$	Adj. $\boldsymbol{R^2}$	$\Delta\ \boldsymbol{R^2}$	*p*
STEP 1: Constant		7.917	<0.001	0.032	0.029	0.178	<0.001
Mother neglect	0.158	0.879	0.380				
Father neglect	0.451	3.135	0.002				
Step 2: Constant		0.409	0.683	0.200	0.191	0.447	<0.001
Mother neglect	0.083	0.503	0.615				
Father neglect	0.319	2.397	0.017				
Extraversion	0.061	0.434	0.664				
Agreeableness	0.200	1.198	0.231				
Conscientiousness	-0.485	-3.458	0.001				
Neuroticism	1.259	8.266	<0.001				
Openness	-0.236	-1.750	0.081				
STEP 3: Constant		1.688	0.092	0.566	0.549	0.752	<0.001
Mother neglect	-0.092	-0.719	0.472				
Father neglect	0.168	1.668	0.096				
Extraversion	0.102	0.849	0.396				
Agreeableness	0.182	1.122	0.262				
Conscientiousness	-0.364	-2.772	0.006				
Neuroticism	-0.298	-1.879	0.061				
Openness	-0.206	-1.935	0.053				
Vulnerable Child Mode	3.833	3.543	<0.001				
Angry Child Mode	2.070	2.418	0.016				
Enraged Child Mode	-1.522	-1.477	0.140				
Impulsive Child Mode	3.019	3.368	0.001				
Undisciplined Child Mode	0.347	0.390	0.697				
Healthy Child Mode	-0.853	-0.837	0.403				
Punitive Mode	-0.582	-0.300	0.764				
Demanding Mode	0.936	0.513	0.608				

Healthy Adult Mode	0.508	0.449	0.653
Compliant Serrenderer Mode	1.376	1.665	0.096
Detached Protector <ode	-0.428	-0.435	0.664
Detached Self-Soother Mode	4.240	5.127	<0.001
Self-Aggrandizer Mode	-0.223	-0.229	0.819
Bully-Attack Mode	1.243	1.200	0.231
HS mode	-2.715	-3.288	0.001
ED Overcontroller Mode	4.369	6.775	<0.001

The overall model found that the 23 predictors accounted for 56.6% of the variance in eating disorder severity ($Adj.R^2 = 0.549$). The overall equation was significant ($F_{(23, 601)} = 34.052$, $p<0.01$) and represented a large effect size of $f^2 = (1.22)$. Five SMI-ED-SF coping modes, vulnerable child ($\beta = 0.211$, p<0.01), impulsive child ($\beta = 0.136$, p<0.01), detached self-soother ($\beta = 0.248$, p<0.01), helpless surrenderer ($\beta = -0.144$, p<0.01) eating disorder overcontroller ($\beta = 0.309$, p<0.01) and one of the BFI personality traits conscientiousness ($\beta = -0.099$, p<0.01) were all significant predictors of ED severity in the final model as shown from the magnitude of the t-statistics.

The CECA-Q childhood neglect and BFI personality trait variables entered into the model prior to the SMI-ED-SF together accounted for 20% of the variance. The SMI-ED-SF modes accounted for a further 36.6% of the variance in ED severity over and above personality traits and childhood neglect.

Childhood emotional neglect by the father ($\beta = 0.151$, p<0.01) was a significant predictor of ED severity when first entered into the model, however the addition of the BFI resulted in it no longer being significant. Similarly, neuroticism ($\beta = 0.364$, p<0.01) was a significant predictor of ED severity when first entered into the model, however the addition of the SMI-ED-SF resulted in it no longer being significant. The five schema modes as listed above and conscientiousness continued

to be significant predictors of ED severity, even when further variables were entered into the model. The above five modes increased predictive ability beyond that provided by the other methods of assessment.

To see if the data met the assumption of collinearity, the coefficients table with collinearity statistics was located. If the VIF value was greater than 10 or the Tolerance was less than 0.1, concerns over multicollinearity was assumed. Otherwise, data met the assumption of collinearity. Tests to see if the data met the assumption of collinearity indicated that multicollinearity was not a concern between most independent variables. However, neglect in childhood were highly multicollinear with the punitive mode (Tolerance = 0.58, VIF = 17.37) and demanding mode (Tolerance = 0.67, VIF = 14.92).

4. Discussion

4.1 Main Findings

This study tested the psychometric properties of the English version of the SMI-ED-SF with both a non-clinical and clinical sample made of people with EDs. Findings revealed adequate concurrent validity – as evidenced by moderate to high significant correlations with the majority of Big Five personality traits. Neuroticism displayed the highest, significant correlations with all schema modes except bully-attack mode. These findings correspond with previous research indicating significant associations between schema modes and neuroticism (Muris, 2006; Sava, 2009; Thimm, 2010). Overall, the maladaptive modes were positively correlated with neuroticism and negatively correlated with extraversion, agreeableness, conscientiousness and openness, and the opposite was true for the healthy modes.

Likewise, the EDDS variables were positively correlated with most of the dysfunctional coping modes, and negatively associated with the healthy modes (healthy adult and happy child). These findings build on previous research highlighting the potentially important relationship between coping modes and ED behaviours (Simpson et al., 2018; Pietrabissa et al., 2019; Talbot et al., 2015; Voderholzer et al., 2014). Five of the coping modes showed high correlations with ED symptoms. The ED overcontroller mode showed the highest correlations with compulsive ED behaviours (fasting and over-exercising), fear of weight gain and over-

evaluation of weight and shape. Correspondingly, the overcontroller mode had a low correlation with binge-eating behaviours. This is consistent with previous findings (Simpson et al., 2018; Pietrabissa et al., 2019), where the EDO mode revealed moderate to high correlations with restraint, exercise and weight and shape concerns and low/non-significant correlations with bingeing studies. Further, Brown et al. (2016) found that the perfectionistic overcontroller mode in their study partially explained the variance in the relationship between perceived negative parenting and food restriction/compensatory behaviour such as over-exercise. These studies all highlight that the overcontroller mode potentially provides individuals with control over their eating rituals to compensate for underlying vulnerability. The ED sufferer utilises restrictive and ritualistic eating, body checking, and exercise in an attempt to control and "improve" their body shape and/or weight, with the goal to minimise the perceived risk of negative emotions that may be schema-triggering, e.g. humiliation and shame, replacing it with predictability, certainty and a sense of self-worth/competence (Simpson, 2012; Waller, Corstorphine & Mountford, 2007). Overall, the EDO mode appears to function as an avoidance mechanism that blocks emotion (Simpson, 2012).

The vulnerable child, punitive, demanding and detached self-soother modes also showed high correlations with compulsive ED behaviours. This suggests that ED behaviours may have multiple functions, depending on the individual case conceptualisation. For example, compulsive behaviours may represent self-punishment (punitive mode), an attempt to meet one's internalised standards

(demanding mode), a means of 'zoning out' in a hypoaroused state (detached self-soother), or of expressing underlying distress, through maintaining a child-like appearance (vulnerable child) (Egeland & Sroufe, 1981). In addition, the vulnerable child mode showed a high correlation with 'over-evaluation of weight and shape'. This may be an indication that a tendency to over-evaluate weight and shape leads to higher distress and experience of shame, as vulnerable child mode is highly linked to distress. Over-evaluation of shape and weight is also correlated with demanding and punitive modes. This may represent the interplay of the punitive mode being harshly critical of the body and any imperfections, and the demanding mode setting higher and unrealistic standards. In turn, this leads to increased distress (vulnerable child).

As hypothesised, binge-eating behaviours significantly correlated with the detached self-soother mode. The detached self-soother mode is linked to avoidance and escape from emotional pain and emptiness, a function that binge-eating serves for many (Janke & Andrea, 2012). In addition, the impulsive/undisciplined child modes showed their strongest correlations with binge-eating behaviours. The impulsive child mode is hypothesised to act in conjunction with the detached self-soother mode (via binge-eating) as a means of impulsive self-soothing (often as a repercussion of overcontroller restrictive coping). Furthermore, in EDs, the impulsive child mode is acting impulsively as an attempt to meet needs (nourishment), before dieting is resumed. In this mode, an individual can act in an uncontrolled manner, without regard to possible consequences. It is usually followed by a deep sense of shame (from

punitive mode attacking vulnerable child), which impulsive child attempts to resolve (Simpson & Smith, In Press).

Two of the coping modes, bully-attack and enraged child, showed particularly low correlations with ED symptoms. These modes are not hypothesised to play a significant role in the maintenance of EDs (Simpson & Smith, In Press; Simpson et al., 2018), and in fact were only endorsed at a very low level by this sample. Overall, the results indicate adequate convergent validity of the SMI-ED-SF.

Discriminant validity was confirmed, with none of the SMI-ED-SF factors significantly associated with height. Test re-test reliability was confirmed for all modes for both healthy and clinical samples. Although this result indicates that the mode scores are stable over time, some considerations need to be taken into account. First, the retest population consisted of those who were motivated enough to complete the SMI-ED-SF for the second time, which may reflect a self-selection bias in the results. Notably, the test-retest results for those with an ED who were not seeing a mental health professional were less stable overtime (r was less than 0.70) compared to healthy controls. The clinical group may be less temporarily stable due to higher fluctuations in modes between T1 and T2. The impulsive child and bully-attack modes also had test-retest correlations below 0.70. Modes which have a test-retest of less than 0.70 may be less stable overtime, which suggests that they are possibly more context specific than the schema theory would suggest. Thus, if these items were removed from the scale, it could make the SMI-ED-SF more stable. Moreover, it could

be due to an unreliable measure of these modes which makes it hard to interpret improvement or deterioration as reflecting reality (because it might be due to measurement error or natural fluctuation).

The SMI-ED-SF was a significant predictor of ED severity, even after a large proportion of the variance had already been accounted for by established predictor variables (childhood neglect and personality traits). Specifically, as well as the detached self-soother, vulnerable and impulsive child modes, the two new ED modes, which were added to the original SMI (helpless surrenderer and eating disorder overcontroller), significantly predicted ED severity above and beyond other predictors. This finding indicates that the SMI-ED-SF has satisfactory incremental validity.

Whilst these findings are preliminary, the data suggest an understanding of schema modes in EDs, in which the child modes (vulnerability, distress, impulsivity) and coping modes (use of avoidant and controlling coping strategies as a means of blocking distress) are strong predictors of ED severity. The punitive and demanding parent modes (shame-inducing messages) often set unrealistically high standards, alongside depriving, attacking and punishing the child modes, triggering high levels of shame and humiliation. ED behaviours thereby function as a means of directing aggression toward the body, appeasing the internal critic through self-punishment, self-flagellation, and perfectionistic striving. Avoidant ED behaviours are used when the distress experienced in deprived/shamed child mode becomes overwhelming, i.e.

they flip into the Detached Self-Soother mode to block out emotional pain and to soothe themselves in a detached way (e.g., by bingeing, vomiting). This then leads to further shame and distress (increased vulnerable child mode). The "needy/impulsive" child can feel more deprived and begin seeking nurturance in an impulsive and entitled manner. Vicious cycles of distress are frequently seen in ED patients within clinical settings, and future studies could analyse the data to establish whether there are any longitudinal patterns. Schema mode conceptualisations may be more accurately developed through the new SMI-ED-SF, thus facilitating the development of more nuanced treatment planning (Pietrabissa et al., 2019; Simpson et al., 2018).

4.2 Clinical Implications

This study supports the psychometric properties of the SMI-ED-SF, including concurrent, convergent, discriminant and incremental validity, alongside its test-retest reliability. The findings are in line with those observed by testing the psychometric properties of the long SMI-ED (Simpson et al., 2018) and the Italian version of the SMI-ED-SF (Pietrabissa et al., 2019). The development of this new, shorter assessment tool increases its usability for clinical and research purposes. The modification of the SMI for EDs provides clinicians with the ability to explore schema modes in this population, reducing patient fatigue compared to the longer SMI-ED. In addition, clinicians will be able to develop and tailor more sophisticated case conceptualisations and treatment, incorporating schema modes that are specifically adapted to the ED population. The new measure will also allow patients to make

important links between their ED symptoms and schema modes, which may help to facilitate formulations and develop a shared understanding between the clinician and patient. This questionnaire will also assist eating disorder and schema-based research.

The findings from this study supports previous theory suggesting the need to explore past experiences and the function of ED behaviours, in combination with maintenance factors, when formulating and treating EDs (Sheffield et al., 2009; Simpson, 2012; Talbot et al., 2015; Waller, Kennerley & Ohanian, 2007). This study also highlights the importance of taking time to explore and conceptualise state-based factors (coping modes) as well as trait-based factors (EMS) in the treatment of EDs. By helping those with EDs to recognise unmet emotional needs, they can begin to challenge unhelpful messages acquired from early experiences and embark on a journey of creating/strengthening a new 'healthy adult' way of coping. This can be done through a range of schema therapy methods, including limited re-parenting techniques, chair-work, empathic confrontation and imagery rescripting. Highlighting unmet needs and developing a sense of self-compassion via these treatment techniques will empower those with EDs to seek healthier and happier relationships. It will also improve their interpersonal skills and enable them to move forward in life with new skills that allows them to get their needs met.

Given the motivational and engagement issues associated with treating this client group, a strength of the new, shortened version of the SMI-ED is how easily it will allow concepts to be identified and understood by clients and clinicians. It offers

a meaningful tool for understanding eating behaviours both within the context of past experiences and the here and now. The SMI-ED-SF and schema mode model helps patients to connect with painful underlying feelings rather than escape them, through exploration of their unique schema modes. The SMI-ED-SF can therefore help the individual to understand their own ED and schema formulation. Increasing patients' capacity to understand their ED within the schema mode model can significantly reduce any shame, which is often accompanied with having an ED. The clinician with these results can focus the work onto which schemas are strongest, and which in this study are most closely linked to difficulties indicated by the EDDS. Knowing which modes are most closely associated with those outcomes might lead a therapist to be more selective in their treatment focus.

Overall, this study has broadened the use of the SMI-ED-SF for both research and clinical settings. The findings represent a step forward in developing an easy-to-use psychometrically sound instrument to identify and explore mechanisms through which schema modes can be expressed by those with EDs. Developing a more precise measure of mode states within an ED population will enhance therapeutic case conceptualisation and treatment planning. This study also showed that schema modes are significantly correlated with specific ED behaviours and personality traits. To enhance the effectiveness of treatment and reduce risk of relapse, ED sufferers with schema-level beliefs may require a treatment model that specifically addresses both eating and personality pathology, as well as childhood trauma. The new SMI-ED-SF

offers patients a tool to quickly and easily begin to explore the early origins of underlying schema level representations that will increase their chances of success in therapy.

4.3 Strengths, Limitations and Recommendations for Future Research

A wide range of recruitment methods were used. Participants were recruited from both clinical and non-clinical populations, via outpatient and inpatient national health services, and online via third sector support networks and social media. While those who are more isolated and avoidant of ED clinical/support services are often underrepresented, this study had the potential to tap into a population that do not present within clinical services. Given the high rates of dropout from treatment, the social media strategy used for recruitment is a strength. In addition, by recruiting from the healthy population, it was inclusive of those who potentially had a reduced capacity to recognise/acknowledge their ED behaviours, including those with subthreshold EDs.

Inpatient services were contacted for recruitment, to include those with more severe EDs. According to the EDDS, 37 participants (5.6% of the whole sample) had low weight AN with a BMI of less than 16. As the survey had an option to save and resume the questionnaire answers later, it allowed patients who are sometimes regarded as being 'too ill to concentrate for lengthy periods of time' to complete the online survey. In addition, where necessary, participants were offered support to help

with completion of the questionnaires (e.g. for low weight patients with AN who struggled to concentrate).

It was not possible to ensure gender homogeneity, however a smaller percentage of males within the sample is typical of the gender ratio found in clinical settings (Striegel-Moore et al., 2009). Recruitment could be further diversified in future studies by engaging and targeting male populations, more weight management services and obesity charities, as BED groups were underrepresented in this study. Future studies could also have an additional question in the survey asking where participants heard about the study. This would help in deciding whether the sample was biased towards those more active on social media or seeking clinical support. It was also not possible to gather data on those who saw the study advertised but chose not to take part.

The use of the EDDS roughly showed which ED groups were represented within the sample. The proportion of those with BED was low compared with AN and BN. Future studies should ensure all ED subgroups are adequately represented within the sample to establish whether individual diagnostic groups are characterised by specific schema mode profiles. Future research could extend the findings to measure personality disorder alongside ED symptomatology to explore the relationship between PD and ED diagnoses, especially since preceding studies have found that schema modes are better explained by PD strength than Axis I disorders (Lobbestael, Arntz & Bernstein, 2010). Further, all data was gathered via self-report, which is

subject to bias. Future studies could include qualitative interviews with both patients and health professionals, to capture the complexity of ED behaviours, personality, childhood abuse and schema modes.

5. Conclusion

This study tested the psychometric properties of the SMI-ED-SF. The findings represent a step forward in developing an easy-to-use psychometrically sound instrument to identify and explore mechanisms through which schema modes are expressed by those with eating disorders. Developing a more precise measure of mode states within an ED population can enhance therapeutic case conceptualisation and treatment planning. New studies with larger numbers in each separate ED subgroup are needed to further test the SMI-ED-SF. This will further broaden its utility as a research and clinical tool.

This study has also shown that schema modes are significantly correlated with specific ED behaviours and personality traits, which may have an impact on treatment. Eating disorder severity is also predicted by childhood neglect, personality, and specific schema modes. To enhance the effectiveness of treatment and reduce risk of relapse, ED sufferers with schema-level beliefs may be better matched to treatment models that specifically address both eating and personality pathology, as well as childhood trauma. The new SMI-ED-SF offers patients a tool to quickly and easily begin to explore the early origins of underlying schema level representations that may increase the accuracy of their case conceptualization, enhance treatment planning, and ultimately the success of therapy.

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Appendices

Appendix A

North of Scotland Research Ethics Committee (2)
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AB15 6RE

Telephone: 01224 558458
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NHS Grampian

05 June 2018

Miss Dorothy Tait
School of Health in Social Science
The University of Edinburgh Medical School
Teviot Place
EDINBURGH
EH8 9AG

Dear Miss Tait

Study title:	**The psychometric properties the Schema Mode Inventory for Eating Disorders-short form (SMI-ED-SF)**
REC reference:	**18/NS/0046**
Protocol number:	**CAHSS1803/01**
IRAS project ID:	**241811**

Thank you for your letter of 29 May 2018, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair.

We plan to publish your research summary wording for the above study on the HRA website, together with your contact details. Publication will be no earlier than three months from the date of this opinion letter. Should you wish to provide a substitute contact point, require further information, or wish to make a request to postpone publication, please contact hra.studyregistration@nhs.net outlining the reasons for your request.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

Conditions of the favourable opinion

The REC favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements. Each NHS organisation must confirm through the signing of agreements and/or other documents that it has given permission for the research to proceed (except where explicitly specified otherwise).

Guidance on applying for HRA and HCRW Approval (England and Wales)/ NHS permission for research is available in the Integrated Research Application System, at www.hra.nhs.uk or at http://www.rdforum.nhs.uk.

Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of management permissions from host organisations.

Registration of Clinical Trials

All clinical trials (defined as the first four categories on the IRAS filter page) must be registered on a publically accessible database within 6 weeks of recruitment of the first participant (for medical device studies, within the timeline determined by the current registration and publication trees).

There is no requirement to separately notify the REC but you should do so at the earliest opportunity e.g. when submitting an amendment. We will audit the registration details as part of the annual progress reporting process.

To ensure transparency in research, we strongly recommend that all research is registered but for non-clinical trials this is not currently mandatory.

If a sponsor wishes to request a deferral for study registration within the required timeframe, they should contact hra.studyregistration@nhs.net. The expectation is that all clinical trials will be registered, however, in exceptional circumstances non registration may be permissible with prior agreement from the HRA. Guidance on where to register is provided on the HRA website.

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

Ethical review of research sites

NHS sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document	Version	Date
Copies of advertisement materials for research participants [Advertisement]	2	29 May 2018
Evidence of Sponsor insurance or indemnity (non NHS Sponsors only) [Employers liability certificate]		01 August 2017
IRAS Application Form	241811/1213642/37/419	28 March 2018
IRAS Checklist XML [Checklist 31052018]		31 May 2018
Other [Additional Insurance Certificate NHS-15CA02-0013]		26 July 2017
Other [Additional Insurance Certificate - Clinical Trial Liability Insurance]		27 July 2017
Other [Additional Insurance Certificate - Professional Indemnity Insurance]		04 August 2017
Other [CV for Chief Investigator (and Student): Dorothy Tait]		22 March 2018
Other [CV for Supervisor: Susan Simpson]		22 March 2018
Other [Thesis Proposal Feedback]		04 January 2018
Other [CV for Academic Supervisor: Fiona Duffy]		29 March 2018
Other [CV for Academic Supervisor: David Gillanders]		29 March 2018
Other [Debriefing Form]	2	29 May 2018
Other [Response letter to REC]	1	29 May 2018
Participant consent form [Participant Consent Form]	2	29 May 2018
Participant information sheet (PIS) [Participant Information Sheet]	2	29 May 2018
Research protocol or project proposal [Research protocol]	2	29 May 2018
Validated questionnaire [Eating Disorder Diagnostic Scale (EDDS) - DSM-5 Version]		28 March 2018*
Validated questionnaire [The Schema Mode Inventory for Eating Disorders - Short Form (SMI-ED-SF)]		28 March 2018*
Validated questionnaire [Big Five Inventory (BFI) - Personality]		28 March 2018*
Validated questionnaire [Family Relationships in Childhood - CECA-Q]		28 March 2018*
Validated questionnaire [CompACT]		28 March 2018*
Validated questionnaire [Demographic questions]	2	29 May 2018

*date received

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Reporting requirements

The attached document *"After ethical review – guidance for researchers"* gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Notification of serious breaches of the protocol
- Progress and safety reports
- Notifying the end of the study

The HRA website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

User Feedback

The Health Research Authority is continually striving to provide a high quality service to all applicants and sponsors. You are invited to give your view of the service you have received and the application procedure. If you wish to make your views known please use the feedback form available on the HRA website:
http://www.hra.nhs.uk/about-the-hra/governance/quality-assurance/

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18/NS/0046	**Please quote this number on all correspondence**

With the Committee's best wishes for the success of this project.

Yours sincerely

Professor Helen Galley
Chair

Enclosures: "After ethical review – guidance for researchers" SL-AR2

Copy to: Ms Charlotte Smith
Miss Melissa Taylor, NHS Lothian Research & Development Office

Appendix B

Study Protocol

Exploring the psychometric properties of the Schema Mode Inventory for Eating Disorders-short form (SMI-ED-SF)

Protocol Author: Dorothy Tait

List of Abbreviations

AN	Anorexia Nervosa
APA	American Psychiatric Association
AS	Aggrieved Surrenderer
BEAT	Beating Eating Disorders Charity
BED	Binge Eating Disorder
BFI	Big Five Inventory
BMI	Body Mass Index
BN	Bulimia Nervosa
BPS	British Psychological Society
CBT	Cognitive Behavioural Therapy
CECA.Q	Childhood Experience of Care and Abuse Questionnaire
CFA	Confirmatory Factor Analysis
CompACT	Comprehensive Assessment of ACT processes
DSM	Diagnostic and Statistical Manual of Mental Disorders
DV	Dependent Variable
EC	Enraged Child
ED	Eating Disorder
EDDS	Eating Disorder Diagnostic Scale
EDO	Eating Disorder Overcontroller
EMS	Early Maladaptive Schemas

GP	General Practitioner
IC	Impulsive Child
MANTRA	Maudsley Anorexia Nervosa Treatment for Adults
NHS	National Health Service
NICE	National Institute for Health and Care Excellence
OCD	Obsessive Compulsive Disorder
PD	Personality Disorder
REC	Research Ethics Committee
SMI	Schema Mode Inventory
SMI-ED	Schema Mode Inventory for People with Eating Disorders
SMI-ED-SF	Schema Mode Inventory for People with Eating Disorders-Short Form
SSCM	Specialist Supportive Clinical Management
ST	Schema Therapy

Background

Eating disorders: Current treatments and clinical outcomes

Eating disorders (EDs) such as anorexia nervosa (AN), bulimia nervosa (BN), binge eating disorder (BED) are linked with day-to-day impairment and can severely affect physical health. A significant number of people with EDs do not respond well to treatment and high dropout rates have been reported in this population. It has been found that patients who drop out of eating disorder treatment often go on to develop chronic symptoms. They are also more likely to be re-hospitalised. AN is known for having the highest death rate of any mental health problem. Although treatment trials have included adult participants with AN, it is an ED without a recommended first-line treatment in an adult population. On the whole, drop-out rates for AN are typically high and less than half of individuals with AN fully recover. Thus, treatment for eating disorders is often linked with long-term health care and repeated episodes of hospitalisation for individuals. This also presents financial costs to healthcare services.

Cognitive Behavioural Therapy (CBT) is identified as the main treatment for many EDs, with positive outcomes shown at post-treatment and follow-up. A choice of other treatments, including family interventions, and many other therapies, is recommended by the Government to be available to patients with EDs in all areas. Although CBT has been claimed to be one of the most effective interventions for EDs, many individuals do not respond to CBT and outcomes remain mixed. Despite this, guided self-help and CBT is recommended as a first-line intervention by The Scottish Government. However, clinical trials have revealed around 50% of those with BN continue to have ED symptoms at the end of therapy. Follow-up data also imply that around one third of patients with BN still meet ED diagnostic criteria after CBT and a large number worsen.

Factors affecting outcomes

Not all EDs are difficult to treat, but there are some that are, due to the person seeing their ED as okay and an acceptable part of their life. In addition, if other psychological problems are present, or if the person has particular personality traits, this can also make treatment more difficult. Research has shown that personality traits can influence the course and outcome of an ED, e.g. obsessive-compulsive personality disorder traits are a poor prognostic feature among patients with anorexia. Harm avoidance and fears about growing up have also been linked specifically to poor outcome in anorexia nervosa.

Poor responses to treatment may be due to a lack of attention paid to historical factors associated with ED development, the existence of deep-rooted beliefs and the insufficiency of a 'here and now'-focused approach. Current treatments also appear to be ineffective in the treatment of rigid personality characteristics, such as perfectionism and avoidant traits, which is common in this population. Considering these issues, it is important we look for other treatments to engage patients with rigid personality traits that may interfere with engagement and effectiveness of interventions.

Psychological Flexibility

"Psychological flexibility" (PF) is a construct that underpins Acceptance and Commitment Therapy. It is the ability to maintain an open and non-defensive posture and to take action to behave effectively towards overarching life goals and values, even in the presence of worrying situations, thoughts, beliefs and feelings. It is a primarily behavioural construct and evidence shows that it is the mechanism by which a number of psychological interventions may operate. The inclusion of Psychological Flexibility in the current study is to determine if PF acts as a go-between of the relationships between childhood trauma, personality functioning, schema mode processes (belief patterns) and eating disordered symptoms.

A case for schema therapy

It has been proposed that Schema Therapy (ST) may be a more effective alternative to CBT when treating EDs, as it has been found to benefit those with more complex presentations and other severe problems. ST was developed to address severe and enduring psychological problems, alongside ingrained personality traits. Research is developing to demonstrate its effectiveness in an ED population. It has been proposed that ST may be particularly suited to the needs of people with EDs, especially those with more complex and long-term difficulties.

Advancements which have been made to the schema approach, intended especially for targeting more complex mental health difficulties, have also shown promise with

complex ED cases. It is thought that this is because ST works at a deeper level to address the core schema-level beliefs that underpin eating disorders.

When people's core emotional needs are not met in childhood, they develop what is called Early Maladaptive Schemas (EMS), i.e. negative core beliefs about ourselves, others and the world. These underpin the ST model. Cognitive and behavioural coping styles maintain EMS's.

New research has shown more consideration to schema "modes". Modes signify groups of EMS and maintenance processes triggered at a certain time. Thus, EMS are constant structures, while schema modes change, reflecting the coping response we experience moment-to-moment. Although dynamic, schema modes are seen as part of the personality and therefore not normally amenable to short-term change. Thus, questionnaires that measure schema modes will be looking at change over the course of longer term therapy. The schema modes are grouped into four main categories (child mode, parent mode, coping mode and healthy mode).

Measurement of schema modes

A 124-item Schema Mode Inventory (SMI) was developed to measure self-reported schema modes. A shortened version of this (118 item) was then validated within a sample of healthy controls and patients with personality disorder. The SMI was mainly created to measure schema modes in people with Borderline and Antisocial PDs, but it has since been adapted to measure schema modes in people with other, more complex PDs. Previous studies have highlighted the need to develop measures to examine schema modes within specific clinical groups, representing different populations.

Schema mode measurement specific to ED populations

Simpson and colleagues (In Press) recently developed a new version of the SMI for people with EDs (SMI-ED) to allow more precise measurement of mode states within an ED-specific population. This questionnaire originated from the 124-item SMI. It was developed through combining 117 items from the original SMI scale with 73 new eating disorder-specific items, resulting in 190 items altogether. The new items (n = 73) were generated by clinicians/researchers specialised in the treatment of eating disorders; two psychologists and one psychiatrist, who all had experience in the field ranging from 6 to 20 years. They chose items based on typical self-statements made by patients across all ED groups. In addition, four patients (two with a diagnosis of AN, one with BED and one with BN) further contributed to the questionnaire creation by suggesting items that were relevant to their most commonly experienced emotional and coping states.

Simpson and colleagues found that this new measure was adequately reliable and valid. Their study was the first step in creating a psychometrically sound tool to assess schema modes in an ED population, and provided new insight into eating disorders and treatment of this population. Research is now needed to replicate their findings to assess further reliability and validity across the range of ED groups. It was also identified that the questionnaire was very lengthy, making it tiresome for patients to carry out. Thus, it is important to find a way of minimising questionnaire burden and to identify whether a shortened version of the scale is possible, as a 190-item questionnaire is too long for use in regular clinical practice. Thus, one rationale for this current study is to reduce fatigue associated with filling in this questionnaire.

Moreover, as Simpson and colleagues' sample was recruited purely via online survey using self-report questionnaires and did not include a diagnostic measure, it was not possible for them to gain diagnostic status for participants. Thus, this study will use a shortened version of the scale which has been recently validated on an Italian population and attempt to include a diagnostic measure to explore different ED diagnostic groups. Schema modes may be more strongly explained by strength of personality traits associated with personality disorders, highlighting the importance of measuring personality traits alongside ED symptoms.

Development of a new shortened form of the SMI-ED

Based on findings from Simpson et al's study (being published), the SMI-ED measure was shortened from 190 to 64 items. The new scale is considerably shorter than the original SMI. A recent study carried out at the University of Milan validated the short SMI-ED scale. Additional standard measures will be administered alongside the shortened schema mode inventory to determine if the new inventory is associated with characteristics that we would predict is should be.

Study Aims

Overall, the aim of this study is to test how well the new shorter measure performs. We will look at whether this new questionnaire is reliable and flexible with regard to item content and psychometric properties to aid its function in a range of settings (clinical, community, research). The briefer version of the SMI-ED can then be completed by service users on a regular basis, to assess schema modes and help inform treatment in ED services. For this study, the new shortened questionnaire has been named "Schema Mode Inventory for Eating Disorders-Short Form" (SMI-ED-SF).

Given that emotional abuse and neglect has been shown to be the strongest (abuse related) predictor of ED behaviours, we will also look at whether schema modes mediate the relationship between emotional neglect/abuse and eating disorder symptoms as a secondary aim. As certain personality traits have been found to complicate treatment, we also want to find out whether personality is linked with

specific schema modes in people who have an eating disorder. In addition, we are going to explore whether Psychological Flexibility acts as a moderator between the relationships amid childhood trauma, personality functioning, schema mode processes and eating disordered symptoms.

Principle Research Objective

The purpose of this study is to test how well a new, shorter measure of the Schema Mode Inventory for people with Eating Disorders (SMI-ED) performs, to facilitate more precise measurement of mode states within a population who self-report disordered eating behaviours.

Secondary Research Questions

1. Given that emotional abuse/neglect has been shown to be the strongest (abuse related) predictor of ED behaviours, we will look at whether schema modes mediate the relationship between emotional neglect/abuse and eating disorder symptoms.

2. Are certain personality traits linked with specific schema modes in people who have an eating disorder?

3. Does Psychological Flexibility act as a moderator between the relationships between childhood trauma, personality functioning, schema mode processes and eating disordered symptoms?

Methodology

Design

The study will use a cross-sectional, quantitative design. Adults who have eating disorder symptomatology (aged> 16 years), alongside healthy adults, will be invited to complete five questionnaires.

This study will focus on exploring the psychometric properties of a shortened version of the SMI-ED, which has been adapted for the Eating Disorder Population. The sample will be recruited from clinical services (within NHS Scotland), charities for people with ED (locally and internationally) and from the general population. Participants will be asked questions to see if they meet criteria for disordered eating patterns, which will be measured by the Eating Disorder Diagnostic Scale (EDDS, DSM-5 Version) (American Psychiatric Association, 2013). Including a healthy sample will help us to explore differences between healthy and clinical samples.

Participants will be asked several demographic questions. One questionnaire (EDDS, 22 items) will be used to determine whether participants meet criteria for an eating disorder (distinguishing between AN, BN or BED). They will then be asked to

complete the new shortened version of the Schema Mode Inventory for people with Eating Disorders (SMI-ED-SF, 64 items) alongside three other questionnaires, which measure personality traits (BFI, 44 items), presence of neglect/abuse in childhood (CECA.Q) and psychological flexibility (CompACT, 23 items).

A series of statistical analyses will be utilised to answer the research questions associated with the current study. These will determine the SMI-ED-SF's convergent validity, incremental validity, divergent validity and test-retest reliability, and help us answer the secondary questions.

Participants

Invited to take part in this study will be english-speaking individuals with and without an eating disorder diagnosis, aged 16+. Participants will be recruited from eating disorder and generic mental health services within NHS Scotland. Advertisements will also be placed on BEAT, the UK's leading charity supporting those affected by eating disorders, Facebook, Twitter, Instagram and other websites of various local and international not-for-profit eating disorder organisations. Healthy controls will be recruited via online advertisement and universities.

Participants will be required to carry out the Eating Disorder Diagnostic Scale (EDDS) (APA, 2013). An overall symptom composite cut-off score of 16.5 on the EDDS accurately distinguishes clinical patients from healthy controls (Krabbenborg et al, 2012). If they have a mean score of less than 16.5 on the EDDS and an absence of eating disorder behaviours; restriction, bingeing and /or purging, they will be classed as "not having an eating disorder/healthy". We are recruiting both a clinical and healthy population.

Participants will be required to voluntarily give informed consent before they can begin the study. Participants will then be asked to fill out the questionnaires, which will be available for completion online, hosted by a questionnaire tool (Bristol Online Survey) which will take around 30 minutes to complete on their first sitting of the questionnaires and another 5 minutes when we ask them to complete the SMI-ED-SF again at a later date, for us to explore test-retest reliability. Participants will then be debriefed.

Procedure

There will be two recruitment pathways into the study:

(1) Via clinicians and posters advertised within NHS Scotland services. In this first pathway, posters advertising the study will be displayed within NHS Scotland, including NHS Lothian, NHS Greater Glasgow and Clyde, NHS Forth Valley, NHS Fife, NHS Lanarkshire and NHS Grampian - both ED-specific services and general community mental health teams. Participants will be directed to the website where

they can fill out the questionnaires and will be given the option to contact the researcher via email if they have any questions about participating.

(2) Advertisements will also be placed in universities, on BEAT (Beating Eating Disorders), the UK's leading charity supporting those affected by eating disorders and campaigning on their behalf, Facebook, Twitter, Instagram and other websites of various local and international not-for-profit eating disorder organisations and support groups. Recruitment advertisements will include a web-link, directing potential participants to the online study.

Once online, participants will be directed to an information sheet, which will tell them about the study. They will then be asked for their consent, ticking an "Agree" consent box to show this. They will also be asked to provide an email address to (1) be contacted 1-2 months later to complete one questionnaire again and (2) be included in a prize draw to win a £100 Amazon gift voucher. After the consent form has been completed, the study will commence and the questionnaires will begin. The consent form will be stored separately from the questionnaire responses to ensure anonymity and confidentiality are maintained. All identifiable and personal information will be kept separate from questionnaire responses and permanently discarded before the responses are analysed to keep the data anonymous.

In the first recruitment pathway, clinicians within NHS Scotland will be asked to identify individuals on their current caseload that may meet inclusion criteria for an eating disorder. Clinicians will be provided with participant information sheets and asked to discuss this with any potential participants. Clinicians will direct participants to the online study by giving them the advertisement/leaflet alongside the Participant Information Sheet.

Potential participants will be given the option to ask the researcher questions, via email, before deciding to take part in the study. They will also be provided with the contact details for the researcher's academic and clinical supervisors on the information sheet. For those potential participants who continue to express an interest in the study, consent will be obtained prior to proceeding with the study measures. They will be informed that measure completion is likely to last approximately one hour. They will be advised that they have the option to take breaks if necessary, and will be encouraged and motivated with messages throughout the online survey tool as they go along. Participants will also be made aware of their right to withdraw from the study at any time, without having to give a reason, and assured that using their right to withdraw will have no impact upon any care they currently receive.

On completion of the questionnaires, participants will be directed to a debrief page where they will be provided with contact details of support services. They will also be provided with information to find out the results on completion of the study, and will be informed that we will contact them at a later date to ask them to complete the

SMI-ED-SF questionnaire (only this one questionnaire) again. They will be asked to provide us with their email address for us to do this.

Inclusion Criteria

There will be two sets of inclusion criteria; one for healthy volunteers and one for participants with an eating disorder.

Participants with an ED:

- Participants will be aged 16 or over.
- Participants will meet the Eating Disorder Diagnostic Scale (EDDS) (American Psychiatric Association, 2013) DSM-5 diagnostic criteria for the presence of disordered eating patterns (e.g. restriction, bingeing and /or purging), thus have a mean score of more than 16.5 on this scale.
- Individuals willing to participate voluntarily.
- Individuals able to give informed consent.

Healthy volunteers:

- Participants will be aged 16 or over.
- Individuals who have a mean score of less than 16.5 on the EDDS, showing an absence of eating disorder behaviours, will be included as part of the healthy sample.
- Individuals willing to participate voluntarily.
- Individuals able to give informed consent.

Exclusion Criteria

There will be two sets of exclusion criteria; one for healthy volunteers and one for participants with an eating disorder.

Participants with an ED:

- Individuals who have a mean score of less than 16.5 on the EDDS, showing an absence of eating disorder behaviours.
- Individuals who have a level of English ability that prevents completion of questionnaires.
- Individuals lacking capacity to consent to research.

Healthy volunteers:

- Individuals who have a mean score of more than 16.5 on the EDDS, meeting DSM-5 diagnostic criteria for the presence of disordered eating patterns (e.g. restriction, bingeing and /or purging).
- Individuals who have a level of English ability that prevents completion of questionnaires.
- Individuals lacking capacity to consent to research.

Study Measures:

Data will be collected through several self-report measures as detailed below:

1. Demographic Survey

Prior to completing the eating disorder-specific questionnaires, a short demographic questionnaire will be carried out to collect general demographic information. This will include age, gender, weight in kg, height in metres (from which BMI can be calculated), education and employment status, their permanent residence and current/past consultation with a mental health professional.

Eating Disorder Measures:

2. The Schema Mode Inventory for Eating Disorders (shortened version) (Simpson et al, Press)

The new 64-item (shortened) version of the SMI-ED is based on four items per factor. Three of the items on each subscale originated from the original SMI, and one of the items on each subscale is a new eating disorder specific item. For each of the new subscales that emerged as factors in the previous study, but not on the original SMI (i.e. the Overcontroller and the Complaining Protector), all 4 of the items were new eating disorder-specific items (i.e. the ones that had highest loadings on these factors in the previous study).

3. Eating Disorder Diagnostic Scale (EDDS) (American Psychiatric Association, 2013)

The EDDS is a 22-item self-report scale for diagnosing AN, BN and BED. This questionnaire has demonstrated temporal reliability (mean k = 0.80) and criterion validity (mean k = 0.83). The overall symptom composite also demonstrated good test-retest reliability (r = 0.87), internal consistency (mean a = 0.89) and convergent validity with existing eating disorder questionnaires (Stice, Telch & Rizvi, 2000). Results from the study carried out by Stice et al (2000) suggests this scale is reliable and valid, and sufficient to utilise in clinical and research settings.

Personality Measure:

4. The Big Five Inventory (BFI) (44 items) (John & Srivastava, 1999)

The BFI is a 44-item inventory that measures an individual on the Big Five Factors (dimensions) of personality (Goldberg, 1993). Each of the factors is then further divided into personality facets. Fossati et al (2011) found the internal consistency reliabilities and all test-retest correlations were greater than .75 for all five BFI scales across all adult samples that carried this questionnaire out. The BFI scales also showed adequate convergent-discriminant validity coefficients. These findings suggest that the BFI provides satisfactory reliability and validity data.

Trauma measure:

5. Childhood Experience of Care and Abuse Questionnaire (CECA.Q; Bifulco, Bernazzani, Moran & Jacobs, 2005)

A self-report questionnaire (CECA.Q) was developed to mirror an existing validated interview measure: the childhood experience of care and abuse (CECA). The questionnaire assesses lack of parental care (neglect and antipathy), parental physical abuse, and sexual abuse from any adult before age 17. The CECA.Q shows satisfactory reliability and validity as a self-report measure for adverse childhood experience. Satisfactory internal scale consistency was achieved on the CECA.Q for antipathy (alpha = .81) and neglect (alpha = .80) scales. There was satisfactory test-retest for both care and abuse scales. Significant associations were found between CECA.Q scales and the parallel interview scales with cut-offs determined for high sensitivity and specificity.

Psychological Flexibility Measure:

6. Comprehensive Assessment of ACT Processes (23 items) (CompACT; Francis, Dawson & Golijani-Moghaddam, 2016)

Psychological Flexibility will be measured using the CompACT, a 23 item measure, that has adequate psychometric properties (e.g. alpha = .91, strong factor structure) (Francis, Dawson & Golijani-Moghaddam, 2016). The 23-itemed version of the CompACT clusters ACT's six processes into three dyadic processes. The CompACT demonstrates good internal consistency. Items on the CompACT are scored on a seven-point Likert scale, ranging from 0 ("strongly disagree") to 6 ("strongly agree").

Total Time to Complete Measures: Approximately 60 minutes
Demographic Survey: 2 minutes
EDDS: 5 minutes
SMI-ED-SF: 20 minutes
BFI: 10 minutes
CECA.Q: 10 minutes

CompACT: 10 minutes

Sample Size

The minimum overall sample size that I need is 234. This may be a mixture of participants from the UK/internationally - it will not matter where they are recruited from. My main analytic strategy is to use regression based analyses and correlation. Cohen (1992) recommends a minimum sample of 84 people to have 80% power to detect moderate correlations or larger at an alpha of .05. Given the high number of correlations being performed in this study, I will need to adjust the significance of p to reduce the type 1 error rate. In this case Cohen suggests at a p of <.01, 125 participants are needed to detect medium sized effects or larger.

For the regression part of the study, Green (1991) suggests that the n is 104 participants, plus the number of independent variables. Thus, if I take the regression as being able to predict the EDDS overall symptom composite, then there are 23 predictors (16 from the SMI, 1 from the The BFI and six from the Childhood Experience of Care and Abuse Questionnaire), which means the sample size will be sufficiently powered to detect medium sized effects or larger at an n of 126. Green also says that you need 50 + 8m to detect the overall significance of the regression, and for the above example, that comes out as 234. Based on this sample size calculation, all the incremental validity anlyses and correlations are subsets of that so the sample size I need is likely 234.

Analysis

Descriptive statistics will be obtained to assess patterns and differences in participant demographics. The shortened questionnaire (SMI-ED-SF) is based on an adaptation from the original (validated) SMI-ED questionnaire. Simpson et al shortened this questionnaire, as described in their recent paper (In Press) and researchers in Milan have already validated the shortened SMI-ED scale (they did this by calculating the 'invariance'). The aim of this project would be for the researchers to re-run the study and carry out further analyses to explore its psychometric properties, including convergent validity, incremental validity, test-retest reliability. In addition, we hope to carry out a mediational/moderator analysis to find out whether there are any relationships between ED modes, personality traits, trauma/neglect and psychological flexibility.

Based on previous research, we anticipate that moderate to large associations will be observed between study variables. We would predict that certain coping modes will be most highly linked to those who have an ED diagnosis and display ED behaviours. For example, individuals who report binge-eating behaviours are predicted to score higher on the Detatched Self-Soother mode, and those who report restriction, over-exercising and purging behaviours are predicted to score higher on the Eating Disorder Overcontroller mode. In addition, those who report high scores on the childhood

trauma questionnaire are more likely to score higher on distress and the Vulnerable Child Mode subset within the SMI-ED-SF. Individuals with AN are often so over-controlled that they may not score highly on any core maladaptive schema modes or show vulnerability/distress. They may know the overcontroller mode so well that they lose touch with their underlying schemas/schema modes, e.g. they may restrict and exercise in such a controlled way to get as far away from their vulnerable child mode as possible.

The data will be evaluated to explore the following psychometric properties of the SMI-ED-SF:

1. Convergent validity

Convergent validity will be assessed using correlation. To establish convergent validity, we hope to show that measures which should be related to the SMI-ED-SF are (in reality) related. To do this, the researcher has chosen short measures that are likely to correlate highly with the schema modes. For instance, as the experience of childhood emotional abuse is one of the strongest predictors for all eating psychopathology (Moulton et al, 2015), we would expect the intercorrelations for item pairings between the childhood trauma measure and the ED schema modes on the SMI-ED-SF to be moderate to strong. We would also expect item pairing between someone who displays personality traits linked to borderline PD, alongside perfectionism/OCD personality traits to correlate high with the SMI-ED-SF.

There are 12 modes which are composed of both traditional and new statements, with a number of original items ranging from 1 to 10 across dimensions. Two modes (Impulsive Child – IC and Enraged Child – EC) only include items retrieved from the original version of the SMI, while the Aggrieved Surrenderer – AS and the Eating Disorder Overcontroller – EDO modes exclusively consisted of new ED-specific statements. Overall, it would be best to look at correlations between individual modes and measures of trauma and PD. This will be of value as previous data show that the shortened mode items are reliable (See Simpson et al (In Press) for the alpha values of individual modes; coefficients ranged from 0.807 to 0.976; meanα-factors = 0.914; SDα-factors= 0.048).

2. Incremental validity

Incremental validity will be assessed by hierarchical linear regression. One important outcome in this population is the EDDS total symptom composite. We would predict that neglect and abuse in childhood would predict higher composite scores. We would also predict that poorer personality function would produce higher symptom composite scores on the EDDS. If we put these two into a hierarchical linear regression, they will remove from the DV (symptom composite) the variance that is associated with those known (well established) predictors. If we then add in the schema modes in one block it will tell us if the SMI-ED-SF adds unique explanatory

variance in predicting symptom severity, over and above known predictors. It must be noted that this is quite a conservative test for a new measure, but a useful one.

3. Test–retest reliability

Test-retest reliability will be assessed by repeated measures correlation and moderation analysis using the PROCESS tool. The SMI-ED-SF will be re-administered again 4 weeks later (retest) and these scores will be compared to their baseline SMI-ED-SF.

4. Mediation / Moderation analysis

Mediation analysis (Hayes, 2013) will be implemented to answer the secondary research questions, e.g. to find out whether specific schema modes mediate the relationship between, e.g. early traumatic events and ED symptoms. Hayes PROCESS macro Model 4 (Hayes, 2013) for SPSS could be used to analyse the data. As suggested by Hayes (2013) direct and indirect effects may be calculated together with the constituent components of the indirect effect (i.e. the effect of early traumatic events on schema modes and the effect of schema modes on complex trauma symptoms). Overall, it would be interesting to see whether any of the coping modes function as mediators between traumatic events and severity of ED symptoms. Given that emotional abuse/neglect has been shown to be the strongest (abuse related) predictor of ED behaviours, we will look at whether schema modes mediate the relationship between emotional neglect/abuse and ED symptoms (on the EDDS).

The aim is to keep this analysis simple and focussed on demonstrating the utility of the new SMI-ED-SF. Thus, for example, if my question is "Is the impact of childhood emotional abuse/neglect on ED symptoms mediated by Maladaptive Schema Modes?", model 4 allows up to 10 mediators in parallel, so we could compare modes together. This analysis aims to further strengthen the utility of the SMI-ED-SF.

Project Management Timetable

Thesis Proposal Submitted	November 2017
Feedback on Proposal Received	January 2018
Refine study following feedback	January-February 2018
Prepare ethics application	January-March 2018
Submit ethics application	March 2018
Recruitment	April 2017-December 2018
Systematic Review	May 2018- December 2018
Data Analysis	January 2019
Final Draft to Supervisor	February 2019
Final Corrections	March 2019
Thesis Submission	March 2019
Viva	April 2019

Management of Risks to the Project

1. Failure to Receive Ethical Approval

Not getting ethical approval is a risk, as is the study requiring considerable alterations before it can be approved. As with all research studies in a vulnerable population, it is anticipated that NHS Research Ethics Committees (RECs) may raise concerns regarding possible adverse outcomes to participants and the management of risk to participants. This may result in the study failing to receive ethical approval. The probability of this is small as many ED patients are not vulnerable and capacity to provide consent to participate should be achieved, so it will be up to them to take part and they will be informed that they can withdraw from the study at any time.

The research preceding the current study, which had similar methodology and inclusion criteria, received full ethical approval. Participants did not report any adverse responses to taking part in the previous study (even though the questionnaire was considerably longer than the one proposed within this study) and the questionnaire was adapted from a validated questionnaire which is commonly used in clinical practice and poses minimal risk to participants (Simpson et al, In Press). Overall, studies preceding this one, on the SMI-ED, gained full ethical approval from the University of Australia and the University of Milan. In addition, the SMI has already been used in standard clinical practice for people with eating disorders and personality disorders.

Details of possible concerns and the actions taken to mitigate risks are detailed below.

1.1.Concerns regarding adverse outcomes/distress as a result of participation

While there is no evidence to suggest that asking individuals with eating disorders about their ED symptoms, or about childhood trauma, results in any serious or long lasting psychological harm, it is possible that some participants may find it distressing. Measures will be put in place to manage participant distress:

1) As this is an online study, participants will not be carrying this study out in the presence of the researchers. Thus, if distressed, they will be asked to contact their GP/Doctor/current key worker/care-coordinator or other mental health professionals/clinical services. All participants will be debriefed at the end of the study and provided with a list of relevant supports, resources and services who can help them.
2) In the unlikely event participants contact the researcher directly (they will only have the researcher's email address), stating they are distressed, the researcher will direct them to appropriate supports and encourage them to contact their GP/Doctor and clinical services. The researcher is a 2nd year Trainee Clinical

Psychologist and will have the clinical ability to manage distress and assess risk if required. The researcher has worked as a Psychological Therapist, prior to their DClinPsych training in a service supporting adults diagnosed with eating disorders, many who had also experienced Childhood Sexual Abuse. The researcher has also done some work at the Rivers Trauma Centre (NHS Lothian), assessing and providing psychological therapy to clients. Thus they have experience in managing potential distress associated with disclosures of ED symptoms and traumatic childhood events. The researcher also has experience in conducting appropriate risk assessments and can use their clinical judgement to make decisions about participants' level of distress. However, as stated above, on completion of the questionnaires, participants will be directed to a debrief page where they will be provided with contact details of support services and encouraged to contact their GP/Doctor/Mental Health Professional if they feel distressed. Thus, they are unlikely to contact the researcher about their distress.

3) Clinical supervision during recruitment will be provided by Dr Susan Simpson, Consultant Clinical Psychologist and Lead Psychologist for the Regional Eating Disorder Unit, NHS Lothian.

1.2.Managing Disclosures of Childhood Trauma

Procedures on managing disclosure are outlined within guidelines published by the British Psychological Society regarding the management of disclosures of historic child sexual abuse (BPS, 2016). The CECA.Q has been used in previous research studies with adults at the University of Edinburgh, which have obtained ethical approval. All participants will be offered a debrief form, so if they disclose a trauma, they will be provided with relevant contact information and support services in case they would like to discuss this further with a specialist service. They will also be encouraged to contact their GP if they would like to discuss anything further.

Overall, participants will be notified that they can withdraw from the study at any time. The questionnaires that have been put forward for use in the study are not excessively invasive, but if there is a risk that completing the questionnaires may trigger difficult emotions, all participants will be provided with contact details for Eating Disorder support organisations and be advised to contact their General Practitioner or Eating Disorder clinician for support if required. The probability of this is small as many patients with eating disorders are not vulnerable and capacity to provide consent to participate should be achieved.

The research preceding the current study, which had similar methodology and inclusion criteria, received full ethical approval. Participants did not report any adverse responses to taking part in the previous study (even though the SMI-ED questionnaire was considerably longer than the one proposed in this study). In addition, the questionnaire was adapted from a validated questionnaire which is commonly used in clinical practice and poses minimal risk to participants (Simpson et

al, In Press). Overall, studies preceding this one, on the SMI-ED, gained full ethical approval. Moreover, the SMI has already successfully been used in standard clinical practice for people with eating disorders and personality disorders.

An increasing amount of research has focused on the long-term impact of trauma research on individuals' wellbeing. So far, studies have failed to demonstrate an association between participating on trauma focused research and long-term emotional distress (Legerski and Bunnell 2010). In addition, research suggests the majority of participants do not experience emotional distress during or immediately after research inquiring about traumatic or aversive events (Galea, Nandi and Vlahov 2005, Griffin et al. 2003).

However, a minority of individuals who participate in research which asks about trauma, may report feeling stressed following the recollection of traumatic experiences (Jorm, Kelly and Morgan 2007). One questionnaire included in this research (CECA.Q) inquire about past experiences of care and abuse, and as such may be more likely to provoke some distress to participants. However, trauma questionnaires are routinely used in research and clinical practice by a number of services including an NHS Lothian specialist trauma service. There have been no indications that completion of these measures causes distress. Thus, the perceived likelihood of participant risk is low.

2. Failure to Recruit Required Sample Size

As will all research in eating disorders, the main risk to the study is the failure to recruit the required sample. Allowing 8 months for recruitment, an average monthly recruitment rate of 30 participants is required to meet the required sample of 234.

The NHS Lothian Eating Disorder service is actively involved in research, but patients may be unwilling to participate in further studies and may feel burned out with filling out questionnaires. This may also be true for other health boards. If the researcher meets with some clinicians face-to-face, this may enhance the recruitment strategy; building rapport and discussing the research may increase their interest and willingness to engage participants. I would therefore be keen to visit NHS services to carry out a brief presentation outlining the aim and importance of this study, to encourage participation. However, we are less able to influence how many people we can recruit via websites and social media, both locally and internationally. I plan to advertise the study on social media, including Twitter, Facebook and Instagram to enhance online recruitment, and hopefully this will allow for a snowball effect with recruitment.

The project timetable has assigned a good amount of time for recruitment (around 8 months), and there is flexibility of extending this. Recruitment will be examined frequently so that we can speedily detect potential risks of under-recruiting. Alternative arrangements can then be made, e.g. recruiting from other health boards out with NHS Scotland. A preventative step could be taken by contacting NHS

services in England to ask if they would be willing to take part in the study. As the Regional Eating Disorder Unit (NHS Lothian) is also participating in a research study based in London, the related service in London could be asked to reciprocate by asking their patients to participate in our study.

The researcher's academic and clinical supervisors have extensive experience of conducting research in the field of eating disorders and have stated it should be feasible to recruit this sample size in the time given, as we are asking multiple NHS services around Scotland and also recruiting internationally, and via social media. Simpson et al's (In Press) study collated data from 573 participants over a 12-month period highlighting that this recruitment strategy has proved to be successful previously. The online recruitment (e.g. through BEAT website etc) has the greatest potential for getting high numbers of participants. If we are unable to recruit 234 participants in the time required, analyses will be carried out based on what we have at the time (stating the low number of participants as a limitation in the study), and we can carry on recruiting thereafter to enable us to reach the model sample. Overall, if the sample size needed is not reached, novel questions can still be answered and original research sufficient for the thesis can still be produced via alternative analyses.

3. Reliance on Others

The study includes some degree of reliance on clinicians to approach potential participants on their caseload regarding the study. This presents potential risk to the project as reliance on others can often be unpredictable, possibly resulting in the failure to recruit the required sample. To reduce the risk of reliance on others, the burden on clinicians has been designed to be low and participants have to self-refer into the study. However, clinicians may leave the service, go off sick, go on maternity leave, etc. They may even forget to engage patients in the study because of time constraints and other stressors within the NHS. To improve response rates, the current study proposes meetings/presentations within services and follow-up telephone calls/emails as a prompt. Regular communication with the clinicians who are helping with recruitment, in NHS services and charities, will be key to flag up any problems related to recruitment. We are also recruiting online, which means we can recruit internationally. Out with the NHS, the research will be reliant upon making good links with people in third sector organisations, such as BEAT, and effective advertising on different websites, locally and internationally. Advertising via social media such as Twitter, Facebook and Instagram will help with making advertising more efficient.

Knowledge Exchange

Once ethical approval has been obtained, the researcher will make the Bristol Online Survey live and begin recruiting. The researcher will also upload the empirical research project protocol to the Open Science Framework (https://osf.io/) in the interest of academic transparency. Once results are available, the researcher will also

attempt to identify academic conferences where it would be appropriate to present the findings of the study.

The results of the study will be written up in portfolio thesis format including a systematic review and empirical research project and submitted to the Doctorate in Clinical Psychology course at the University of Edinburgh. The researcher's thesis will be uploaded to the Department of Clinical Psychology Thesis Database to ensure open access to the results of the study. The systematic review and empirical research project will subsequently be prepared for submission to an academic journal. The researcher will endeavour to publish in a journal that allows open access so that results are available to the widest possible audience.

The researcher will also prepare a powerpoint presentation detailing the findings of their study following submission. The trainee will offer to present findings to NHS Mental Health Teams from which participants were recruited, if teams are interested. Finally, the full results of the thesis project and an overview of findings will be prepared and made available to participants following submission, together with an easy-read summary, which will be emailed to all participants.

Costs

The main costs for this study will be the printing/photocopying required to produce posters advertising the study, participant and clinician information sheets. Other cost likely to be incurred will be travel across NHS Health Boards if I need to go out to discuss the study with any recruiting clinicians. NHS Lothian shall meet these costs. All study questionnaires are in the public domain and are free to use. The research team would also like to thank people for taking part, by giving them the opportunity to be included in a prize raw to win a £100 amazon voucher (funded by the researcher's own money).

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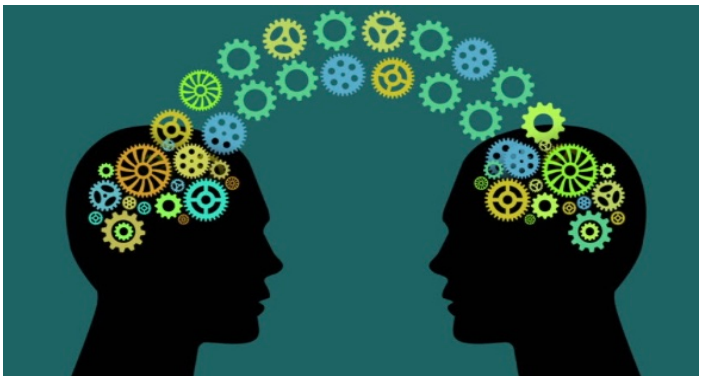
Appendix C

Date: 03.08.18, Version 3, IRAS Project ID: 241811

THE UNIVERSITY *of* EDINBURGH

NHS SCOTLAND



PARTICIPANTS NEEDED FOR ONLINE STUDY!

- This study aims to develop a new questionnaire for people with eating disorders. It will also investigate links between adverse childhood experiences, personality and distress.
- We are seeking people aged 16+ with a wide range of experiences, from those who have a healthy relationship with food to those with disordered eating. As a participant you will be asked to:
  a) Complete 5 online questionnaires (approx 30 mins).
  b) Complete 1 questionnaire again at a later date.
- As a thank you for participating we would like to enter you in a prize draw for the opportunity to win a £100 Amazon voucher.
- To participate, please go to this online link:

https://doctoratestudy.com

- If you have any questions, please email Dorothy Tait at s0452919@ed.ac.uk

Appendix D

Participant Information Sheet

The psychometric properties of the Schema Mode Inventory for Eating Disorders-short form (SMI-ED-SF)

You are being invited to take part in a research study. Before you decide whether to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully. Talk to others about the study if you wish and contact us if there is anything that is not clear or if you would like more information. Take time to decide whether you wish to take part.

What is the purpose of the study?

There is good evidence that psychological problems in adulthood result from patterns of thinking and feeling that begin in response to negative early life experiences. We call these patterns of thinking and feeling 'core beliefs' or 'schemas'. These patterns influence people's experiences and behaviours. Examples of core beliefs include "I am unlovable", "Other people can't be trusted" and so on. Our team's research has shown that these core beliefs have a major impact on people with eating disorders and how they respond to treatment. Core beliefs are an important focus for psychological therapy, and we know that they can be changed, softened or their influence reduced. These changes are associated with improvements in wellbeing and functioning.

Over recent years, mental health researchers have developed ways of assessing these patterns using questionnaires that people can complete in their own time. These questionnaires can be used to test theories and gain knowledge about how these

patterns affect people, leading to developments in treatments. The problem is that at present the questionnaires used to evaluate these patterns are very long (over 120 items) and are not specific to the kinds of patterns seen in people with eating disorders. This team of researchers has developed a shorter form of the questionnaire (64 items) that also has specific patterns of responding that have been observed in people with eating disorders. The aim of this research is to test how well the new shorter measure performs. A shorter measure will be better for patients, easier to score and more useful in research and clinical practice.

We will also be exploring the relationship between people's schema modes (patterns of feeling, thinking and behavior) and personality, traumatic experiences and psychological flexibility. This may inform new ways of identifying and responding to people who have an eating disorder.

Why have I been invited to take part?

We are interested in hearing from people with a wide variety of different experiences, including those who have had problems with their eating and those who have not. You do not need to have experienced an eating disorder or traumatic event during childhood to take part in the current study. Thus, anyone can take part if they are above 16-years-old and able to give informed consent.

Do I have to take part?

No, it is completely up to you whether to take part. If you do decide to take part, you will be asked to read through a consent form and tick a box at the beginning of the online questionnaire to show you understand what the study involves and that you are willing to take part. However, if you decide to take part and consent, you are still free to withdraw from the study at any time, without giving a reason. Deciding not to take part or withdrawing from the study will not affect the healthcare that you receive, or your legal rights.

What will happen if I take part?

You will be required to voluntarily give informed consent before you can begin the study. You will then be asked to answer a few basic questions at the beginning about your age, weight, height, etc. You will then be required to complete five questionnaires (two which are eating disorder-related, one which is personality-related, one which asks about childhood experiences and one which asks about psychological processes). These questionnaires are hosted by a questionnaire tool (Bristol Online Survey) which will take around 30 minutes to complete. You will then be debriefed and provided with information about useful websites and support services. We will then get in touch with you 1-2 months after you have completed these questionnaires, to ask if you can complete one of the questionnaires again.

What are the possible benefits of taking part?

While there may be no direct benefit of taking part in this study, it is hoped that you will derive some satisfaction from taking part in a study that could have wider benefits for the population in the future. Developing a questionnaire which is easy to use and which will help our understanding of the relationship between schema modes, eating disorders, personality traits, trauma and psychological flexibility has the potential to lead to new or more effective psychological therapies and might serve to reduce stigma against individuals currently experiencing eating disorders. Overall, what we tend to find is that people derive some satisfaction from their inclusion in research that intends to improve patient care.

Finally, carrying out the questionnaires has the potential to lead to a better understanding of any difficulties you may experience, now or in the future. This in turn might lead to you enquiring about specific interventions, most likely psychological therapy, aimed at addressing any difficult feelings, thoughts or behaviours which may be maintaining any eating problems or other difficulties. It may also encourage you to seek support for any history of traumatic events during childhood. You will be provided with information to find out about the results on completion of the study.

What are the possible disadvantages and risks of taking part?

There is no evidence to suggest that asking people about eating problems or difficult childhood events results in any serious or long-lasting harm. It is possible that the questionnaires might ask you about things that you find upsetting. If this is the case for you, please seek support from your General Practitioner (GP)/doctor or discuss things with a mental health professional. It is also possible that you may find the questionnaires tiring. You can have as many short breaks as you need when filling out the questionnaires. There is also an option where you can stop, save and finish the questionnaire later.

Will my taking part in the study be kept confidential?

Your taking part in the study will be kept confidential. Information collected during the study will **NOT** be fed back to anyone, including your GP/doctor/any other health professionals. If you become distressed throughout or after the study, or are concerned about your safety or the safety of others, we would encourage you to share this information with your GP/doctor, your keyworker/care-coordinator, or a member of a mental health team to keep you and others safe. If you have any questions about this, please ask the researcher.

The consent form with email addresses will be kept separate from questionnaire responses and permanently discarded before the responses are analysed to keep the data anonymous.

What will happen to my data?

All completed study questionnaires will be stored securely on a password protected database within a password protected NHS Lothian computer. Fully anonymised data (data with any identifiable information removed) will then be transferred to a University of Edinburgh password protected computer for analysis. Any personal data will be destroyed once the study is finished in April 2019.

What will happen to the results of the study?

This study forms part of the researcher's Doctorate in Clinical Psychology training. Anonymised data may be written up for publication or presented at a conference. You would not be identifiable in any output and may request a summary of study findings.

What if there is a problem?

If you have a concern about any aspect of this study please contact Dorothy Tait at *s0452919@ed.ac.uk*. She will do her best to answer your questions.

In the unlikely event that something goes wrong and you are harmed during the research and this is due to someone's negligence then you may have grounds for legal action for compensation against NHS Lothian, but you may have to pay your legal costs. The normal National Health Service complaints mechanisms will still be available to you (if appropriate).

Who is organising the research?

The research has been designed and being carried out by Dorothy Tait, a Trainee Clinical Psychologist undertaking a Doctorate in Clinical Psychology at the University of Edinburgh. The study is being supervised by Dr Susan Simpson (Consultant Clinical Psychologist, NHS Lothian), Dr David Gillanders (Senior Lecturer/Academic Director, University of Edinburgh) and Dr Fiona Duffy (Clinical Psychologist/Lecturer at the University of Edinburgh). Funding and sponsorship has been provided by the University of Edinburgh.

Who has reviewed the research?

The North of Scotland (2) Research Ethics Committee has reviewed the study and full ethical approval was received.

Who can I contact about this study?

If you have any questions or would like any further information about the study, please contact the researcher:

Dorothy Tait, Trainee Clinical Psychologist, NHS Lothian/University of Edinburgh
Email: s0452919@ed.ac.uk

If you would prefer, you can ask a member of your care team to contact the researcher on your behalf.

If you wish, you can also contact the supervisors of the study, Dr Susan Simpson, Dr David Gillanders or Dr Fiona Duffy at:

s.simpson@nhs.net or 01506 523 740
david.gillanders@ed.ac.uk or 0131 651 3946
fiona.duffy@ed.ac.uk or 0131 455 3335

If you would like to discuss this study with someone independent of the research team, please contact:

Dr Helen Sharpe
Lecturer
University of Edinburgh
School of Health in Social Science
Doorway 6, Medical Quad
Teviot Place
Edinburgh
EH8 9AG

Tel: 0131 651 3949
Email: helen.sharpe@ed.ac.uk

If you wish to make a complaint about the study, please contact NHS Lothian:

Patient Experience Team
NHS Lothian
2nd Floor
Waverley Gate
2-4 Waterloo Place
Edinburgh
EH1 3EG
Tel: 0131 536 3370
Email: feedback@nhslothian.scot.nhs.uk

The above contact is not part of the research team.

Thank you for taking the time to read this information sheet

How do I take part?

Please go to the following link to take part in this online study:

https://doctoratestudy.com/

You may contact the researcher directly through their email address (*s0452919@ed.ac.uk)* to discuss the study in more detail if you would like to. During this contact, the researcher will give you further information about the study, and answer any questions you may have.

Appendix E

Participant Consent Form

Study Title: The psychometric properties of the Schema Mode Inventory for Eating Disorders-short form (SMI-ED-SF).
Name of Researchers: Dorothy Tait. Supervisors: Dr Susan Simpson, Dr David Gillanders, Dr Fiona Duffy

1. I confirm that I have read and understood the information sheet (Version 2, 25.05.18, Pages 1-5) for the above study and have had the opportunity to consider the information and ask questions.
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason, without my medical care or legal rights being affected.
3. I understand that relevant sections of data collected during the study may be looked at by individuals from the regulatory authorities and from the Sponsor(s) (NHS Lothian and the University of Edinburgh) or from the/other NHS Board(s) where it is relevant to my taking part in this research. I give permission for those individuals to have access to my records.
4. I understand that non-identifiable data may be transferred from the research site to the university.
5. I understand that the findings of this study will be submitted for publication.
6. I understand that I may be contacted by the researcher 1-2 months after completing the first set of questionnaires to complete one questionnaire again.
7. If I complete this study, I would like to be added to the prize draw to possibly win a £100 amazon gift voucher.
I agree to the above statements, and by completing the questionnaire and submitting it I understand I am consenting to take part in this study <tick box> AGREE
To be added to the £100 Amazon gift voucher prize draw and to be contacted by the researcher about the second half of the study, my email address is: ……. <This will be on a separate page of the questionnaire>.

Appendix F

THE UNIVERSITY
of EDINBURGH

Demographic Questionnaire

Is your first language English? (If you struggle to interpret any of the questions, please discontinue the questionnaire)

- ☐ Yes
- ☐ No

What is your country of permanent residence?

- ☐ UK
- ☐ Other
  Please state country:
- ☐ Prefer not to say

Marital Status:

- ☐ Single
- ☐ Married/civil partnership/cohabiting
- ☐ Divorced or separated
- ☐ Widowed
- ☐ Prefer not to say

Education:

- ☐ Primary school
- ☐ Secondary school/High school

- ☐ College
- ☐ master degree - university
- ☐ doctorate
- ☐ Other
- ☐ Prefer not to say

Occupation:

- ☐ Student
- ☐ Employed Full-time
- ☐ Emplyed Part-time
- ☐ Self-employed
- ☐ Unemployed
- ☐ Retired
- ☐ Other

Have you ever received an Eating Disorder diagnosis (Anorexia Nervosa, Bulimia Nervosa, Binge Eating Disorder or Other Specified Feeding or Eating Disorder?)

- ☐ Yes
- ☐ No

If YES, which one:

- ☐ Anorexia Nervosa
- ☐ Bulimia Nervosa
- ☐ Binge Eating Disorder
- ☐ Other Specified Feeding or Eating Disorder
- ☐ Prefer not to say

Are you currently seeing a mental health professional?

- ☐ Yes
- ☐ No
- ☐ Prefer not to say

If no, have you seen a mental health professional in the last year?

- ☐ Yes
- ☐ No
- ☐ Prefer not to say

Appendix G

PhenX Toolkit

PhenX Measure: Eating Disorders Screener (#120600)
PhenX Protocol: Eating Disorder Diagnostic Scale (DSM-5) (#120602)

Date of Interview/Examination (MM/DD/YYYY): _____

Eating Disorder Diagnostic Scale (EDDS) – DSM-5 VERSION

Please carefully complete all questions, choosing NO or 0 for questions that do not apply.

Over the past 3 months…	Not at all		Slightly		Moderately		Extremely
1. Have you felt fat?	0	1	2	3	4	5	6
2. Have you had a definite fear that you might gain weight or become fat?	0	1	2	3	4	5	6
3. Has your weight or shape influenced how you judge yourself as a person?	0	1	2	3	4	5	6

4. During the past 3 months have there been times when you have eaten what other people would regard as an unusually large amount of food (e.g., a pint of ice cream) given the circumstances?

[ ] YES

[ ] NO

5. During the times when you ate an unusually large amount of food, did you experience a loss of control (e.g., felt you couldn't stop eating or control what or how much you were eating?

[ ] YES

[ ] NO

6. How many times per month on average over the past 3 months have you eaten an unusually large amount of food and experienced a loss of control?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16+

During episodes of overeating with a loss of control, did you…

7. Eat much more rapidly than normal?

[ ] YES

[ ] NO

8. Eat until you felt uncomfortably full?

[ ] YES

[ ] NO

9. Eat large amounts of food when you didn't feel physically hungry?

[ ] YES

[ ] NO

10. Eat alone because you were embarrassed by how much you were eating?

[ ] YES

[ ] NO

11. Feel disgusted with yourself, depressed, or very guilty after overeating?

[ ] YES

[ ] NO

12. If you have episodes of uncontrollable overeating, does it make you very upset?

[ ] YES

[ ] NO

In order to prevent weight gain or counteract the effects of eating, how many times per month on average over the past 3 months have you:

13. Made yourself vomit?	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+
14. Used laxatives or diuretics?	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+
15. Fasted (skipped at least 2 meals in a row)?	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+

16. Engaged in more intense exercise specifically to counteract the effects of overeating

---

17. How many times per month on average over the past 3 months have you eaten after awakening from sleep or eaten an unusually large amount of food after your evening meal and felt distressed by the night eating?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16+

18. How much do eating or body image problems impact your relationships with friends and family, work performance, and school performance?

Not at all		Slightly		Moderately	Extremely
1	2	3	4	5	6

19. How much do you weigh? If uncertain, please give your best estimate.

_____lbs. -or- ___kg.

20. How tall are you? _____ft. _____in. -or- _____cm.

21. What is your highest weight at your current height?_____lbs. -or- ____kg

22. What is your sex?

[ ] MALE

[ ] FEMALE

What is your age? _____

Appendix H

SMI-ED-SF

Name:_____ Date of Birth:_____

Highest Educational Level:_____ Today's Date:_____

INSTRUCTIONS: Please answer all questions by selecting ONLY ONE numeric value that best represents what you feel right now.

FREQUENCY:	0 = Never or almost never	3 = Frequently
	1 = Rarely	4 = Most of the time
	2 = Occasionally	5 = Always

Frequency	
VC	1. I feel lonely
	2. If I lose control of my eating I feel unsafe
	3. I feel lost
	4. I feel weak and helpless
AC	5. I have a lot of anger inside of me that I can only soothe through my eating behaviours (e.g. restriction, bingeing, purging, exercising)
	6. I feel like telling people off for the way they have treated me
	7. I have a lot of anger built up inside of me that I need to let out
	8. I feel like lashing out or hurting someone for what he/she did to me
EC	9. I destroy things when I'm angry
	10. I have rage outbursts
	11. My anger gets out of control
	12. I have been so angry that I emotionally hurt others (e.g. by shouting at him/her)
IC	13. I say what I feel or do things impulsively, without thinking of the consequences
	14. It feels impossible for me to control my impulses
	15. I act first and think later
	16. If I feel the urge to do something, I just do it
UC	17. I don't discipline myself to complete routine or boring tasks

FREQUENCY:	0 = Never or almost never	3 = Frequently
	1 = Rarely	4 = Most of the time
	2 = Occasionally	5 = Always

	18. I can't bring myself to do things that I find unpleasant, even if I know it is for my own good
	19. It's not worth the effort to plan how you'll handle situations
	20. If I can't reach a goal, I become easily frustrated and give up
HC	21. I feel loved and accepted
	22. I feel at peace on my own
	23. I feel content and at ease
	24. I feel connected to other people
PM	25. I don't deserve anything that gives me pleasure (e.g. eating, play, nurturance)
	26. I'm a bad person
	27. I don't allow myself to do pleasurable things that other people do because I'm bad
	28. I deny myself pleasure because I don't deserve it
DM	29. I demand high standards of my body to avoid being judged
	30. I sacrifice pleasure, health, or happiness to meet my own standards
	31. My life revolves around getting things done and doing them right
	32. I know that there is a 'right' and a 'wrong' way to do things; I try hard to do things the right way, or else I start criticising myself
HA	33. I feel that I am basically a good person
	34. I assert what I need without going overboard
	35. I have a good sense of who I am and what I need to make myself happy
	36. I feel able to learn, grow and change
CS	37. I let other people get their own way instead of expressing my own needs
	38. In relationships, I let the other person have the upper hand
	39. I try very hard to please other people in order to avoid conflict, confrontation or rejection
	40. In relationships, I have to give more to compensate for my lack of worth
DetPr	41. I feel distant from other people
	42. If people try to come too close I keep them at a distance
	43. I feel detached (no contact with myself, my emotions or other people)
	44. I don't care about anything; nothing matters to me
DetSS	45. My eating behaviours (i.e. restriction, bingeing, purging, exercising) help me to detach from difficult emotions

FREQUENCY:	0 = Never or almost never	3 = Frequently
	1 = Rarely	4 = Most of the time
	2 = Occasionally	5 = Always

	46. I like doing something exciting or soothing to avoid my feelings (e.g. working, gambling, eating, exercise, shopping, sexual activities, watching TV)
	47. I work or play sports intensively so that I don't have to think about upsetting things
	48. I want to distract myself from upsetting thoughts and feelings
SA	49. I'm quite critical of other people
	50. I feel I shouldn't have to follow the same rules that other people do
	51. Thinness is a way in which I can be better than others
	52. I'm demanding of other people
BA	53. By dominating other people, nothing can happen to you
	54. I belittle others
	55. If you don't dominate other people, they will dominate you
	56. I always look for ways to outsmart others, to ensure that they cannot take advantage of me or hurt me in any way
HS	57. I want people to understand me without me having to say anything
	58. I need people to listen to me and make me feel better
	59. It's too hard to make changes to my behaviour
	60. I feel angry and desperate when people can't see I need help
EDO	61. Feeling in control of my eating 'trumps' any problems or disappointments going on in my life
	62. Controlling my eating gives me a physical and mental 'high'
	63. Controlling my eating makes me feel in control of everything
	64. Controlling my eating stops me being too needy

VC – Vulnerable Child; AC – Angry Child; EC – Enraged Child; IC – Impulsive Child; UC- Undisciplined Child; HC - Happy Child; PP - Punitive Mode; DP - Demanding Mode; HA – Healthy Adult; CS – Compliant Surrenderer; DetPr – Detached Protector; DetSS – Detached SelfSoother; SA – Self Aggrandiser; BA – Bully-Attack; HS – Helpless Surrenderer; EDO- Eating Disorders Overcontroller

***Schema Mode Inventory for Eating Disorders – Short Form (SMI-ED-SF; 2019) Simpson, Pietrabissa, Rossi, & Castelnuovo, Schema Therapy Scotland.**

Derived from:
(1) SMI-ED Simpson, Pietrabissa, Rossi, Seychell, Manzoni, Munro, Nesci, & Castelnuovo, 2018

(2) SMI © Young, Arntz, Atkinson, Lobbestael, Weishaar, van Vreeswijk, & Klokman, 2008

References:

Pietrabissa, G., Rossi, A., Castelnuovo, G., Tagliagambe, A., Bertuzzi, V., Volpi, C., Fava, G., Manzoni, G. M., Gravina, G. & Simpson, S. (2019). Translation and Evaluation of the Reliability and validity of the Italian version of the Schema Mode Inventory for Eating Disorders - Short-Form. *Eating & Weight Disorders.* DOI: 10.1007/s40519-019-00644-5

Appendix I

BIG FIVE INVENTORY (BFI)

Reference

John, O. P., & Srivastava, S. (1999). The Big-Five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (Vol. 2, pp. 102–138). New York: Guilford Press.

Description of Measure:

44-item inventory that measures an individual on the Big Five Factors (dimensions) of personality (Goldberg, 1993). Each of the factors is then further divided into personality facets.

The Big Five Factors are (chart recreated from John & Srivastava, 1999):

Big Five Dimensions	**Facet (and correlated trait adjective)**
Extraversion vs. introversion	Gregariousness (sociable) Assertiveness (forceful) Activity (energetic) Excitement-seeking (adventurous) Positive emotions (enthusiastic) Warmth (outgoing)
Agreeableness vs. antagonism	Trust (forgiving) Straightforwardness (not demanding) Altruism (warm) Compliance (not stubborn) Modesty (not show-off) Tender-mindedness (sympathetic)
Conscientiousness vs. lack of direction	Competence (efficient) Order (organized) Dutifulness (not careless) Achievement striving (thorough) Self-discipline (not lazy) Deliberation (not impulsive)
Neuroticism vs. emotional stability	Anxiety (tense) Angry hostility (irritable) Depression (not contented) Self-consciousness (shy) Impulsiveness (moody) Vulnerability (not self-confident)
Openness vs. closedness to experience	Ideas (curious) Fantasy (imaginative) Aesthetics (artistic) Actions (wide interests) Feelings (excitable) Values (unconventional)

For more information about the Big Five, visit this website:
http://www.uoregon.edu/~sanjay/bigfive.html#where

Abstracts of Selected Related Articles:

Bouchard, T. J. & McGue, M. (2003). Genetic and environmental influences on human psychological differences. *Journal of Neurobiology*, *54*, 4-45.

> Psychological researchers typically distinguish five major domains of individual differences in human behavior: cognitive abilities, personality, social attitudes, psychological interests, and psychopathology (Lubinski, 2000). In this article we: discuss a number of methodological errors commonly found in research on human individual differences; introduce a broad framework for interpreting findings from contemporary behavioral genetic studies; briefly outline the basic quantitative methods used in human behavioral genetic research; review the major criticisms of behavior genetic designs, with particular emphasis on the twin and adoption methods; describe the major or dominant theoretical scheme in each domain; and review behavioral genetic findings in all five domains. We conclude that there is now strong evidence that virtually all individual psychological differences, when reliably measured, are moderately to substantially heritable.

Tkach, C., & Lyubomirsky, S. (2006). How do people pursue happiness?: Relating personality, happiness-increasing strategies, and well-being. *Journal of Happiness Studies, 7*, 183-225.

> Five hundred ethnically diverse undergraduates reported their happiness strategies – that is, activities undertaken to maintain or increase happiness. Factor analysis extracted eight general strategies: Affiliation, Partying, Mental Control, Goal Pursuit, Passive Leisure, Active Leisure, Religion, and Direct Attempts at happiness. According to multiple regression analyses, these strategies accounted for 52% of the variance in self-reported happiness and 16% over and above the variance accounted for by the Big Five personality traits. The strongest unique predictors of current happiness were Mental Control (inversely related), Direct Attempts, Affiliation, Religion, Partying, and Active Leisure. Gender differences suggest that men prefer to engage in Active Leisure and Mental Control, whereas women favor Affiliation, Goal Pursuit, Passive Leisure, and Religion. Relative to Asian and Chicano(a) students, White students preferred using high arousal strategies. Finally, mediation analyses revealed that many associations between individuals' personality and happiness levels are to some extent mediated by the strategies they use to increase their happiness – particularly, by Affiliation, Mental Control, and Direct Attempts.

Shiota, M.N., Keltner, D., & John, O. P. (2006). Positive emotion dispositions differentially associated with Big Five personality and attachment style. *The Journal of Positive Psychology, 1*, 61-71.

> Although theorists have proposed the existence of multiple distinct varieties of positive emotion, dispositional positive affect is typically treated as a unidimensional variable in personality research. We present data elaborating conceptual and empirical differences among seven positive emotion dispositions in their relationships with two core personality constructs, the "Big Five" and adult attachment style. We found that the positive emotion dispositions were differentially associated with self- and peer-rated Extraversion, Conscientiousness, Agreeableness, Openness to Experience, and Neuroticism. We also found that different adult attachment styles were associated with different kinds of emotional rewards. Findings support the theoretical utility of differentiating among several dispositional positive emotion constructs in personality research.

Scale:

The Big Five Inventory (BFI)

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement.

Disagree strongly	Disagree a little	Neither agree nor disagree	Agree a little	Agree Strongly
1	2	3	4	5

I see Myself as Someone Who...

____1. Is talkative

____2. Tends to find fault with others

____3. Does a thorough job

____4. Is depressed, blue

____5. Is original, comes up with new ideas

____6. Is reserved

____7. Is helpful and unselfish with others

____8. Can be somewhat careless

____9. Is relaxed, handles stress well

____10. Is curious about many different things

____11. Is full of energy

____12. Starts quarrels with others

____13. Is a reliable worker

____14. Can be tense

____15. Is ingenious, a deep thinker

____16. Generates a lot of enthusiasm

____17. Has a forgiving nature

____18. Tends to be disorganized

____19. Worries a lot

____23. Tends to be lazy

____24. Is emotionally stable, not easily upset

____25. Is inventive

____26. Has an assertive personality

____27. Can be cold and aloof

____28. Perseveres until the task is finished

____29. Can be moody

____30. Values artistic, aesthetic experiences

____31. Is sometimes shy, inhibited

____32. Is considerate and kind to almost everyone

____33. Does things efficiently

____34. Remains calm in tense situations

____35. Prefers work that is routine

____36. Is outgoing, sociable

____37. Is sometimes rude to others

____38. Makes plans and follows through with them

____39. Gets nervous easily

____40. Likes to reflect, play with ideas

____41. Has few artistic interests

____20. Has an active imagination

____21. Tends to be quiet

____22. Is generally trusting

____42. Likes to cooperate with others

____43. Is easily distracted

____44. Is sophisticated in art, music, or literature

Scoring:

BFI scale scoring ("R" denotes reverse-scored items):

Extraversion: 1, 6R, 11, 16, 21R, 26, 31R, 36
Agreeableness: 2R, 7, 12R, 17, 22, 27R, 32, 37R, 42
Conscientiousness: 3, 8R, 13, 18R, 23R, 28, 33, 38, 43R
Neuroticism: 4, 9R, 14, 19, 24R, 29, 34R, 39
Openness: 5, 10, 15, 20, 25, 30, 35R, 40, 41R, 44

Appendix J

ID:

FAMILY RELATIONSHIPS IN CHILDHOOD

CECA-Q

This questionnaire concerns aspects of childhood. We are equally interested in people with TYPICAL OR ATYPICAL experience.

We would be very grateful if you could fill in all of the following questions about yourself.

Your gender:
(Please circle) MALE/ FEMALE

Your current age:.....….

Today's date:.....….
DD/MM/YY

1A. WHO BROUGHT YOU UP BEFORE AGE 17?
List the the **PARENT FIGURES** who brought you up in childhood for at least a year or longer. Circle any of those that apply:

Mother figure(s)	Father figure(s)
0. Birth mother	1. Birth father
1. Stepmother	2. Stepfather
2. Female relative……	3. Male Relative
3. Family friend (incl godparent)	4. Family friend
4. Foster mother	5. Foster father
5. Adoptive mother	6. Adoptive father
6. Other……	7. Other……

1B. Were you ever in a children's home or institution prior to age 17? **YES/NO**
(Please circle) If yes:
What was the total length of time in the children's home?_____years
(Loss)

1C LOSS OF PARENT BEFORE AGE 17	**MOTHER**	**FATHER**
Did either parent die before you were age 17?	**YES/ NO**	**YES/ NO**
IF YES: What age were you?	**AGE.....**	**AGE.....**
Have you ever been separated from your parent for one year or more before age 17?	**YES/ NO**	**YES/ NO**
IF SEPARATED:	**MOTHER**	**FATHER**
At what age were you first separated?	**AGE.....**	**AGE**.....
How long was this separation?	**.....** **YEARS**	**.....** **YEARS**
What was the reason for separation? (please circle)	1. Illness 2. Work 3. Divorce/ separation 4. Never knew parent 5. Abandoned 6.Other reason	1. Illness 2. Work 3. Divorce/ separation 4. Never knew parent 5. Abandoned 6.Other reason

Please describe your experience.....

2. AS YOU REMEMBER YOUR MOTHER FIGURE IN YOUR FIRST 17 YEARS:
Please circle the appropriate number. If you more than one mother figure, choose the one you were with longest, or the one you found most difficult to live with.

WHICH MOTHER FIGURE ARE YOU DESCRIBING BELOW?

1. Birth mother
2. Step-mother/father's live-in partner
3. Other relative e.g. aunty, grandmother
4. Other non-relative e.g. foster mother, godmother
5. Other (describe).....

(Neg/Ant)		**YES DEFINITELY**		**UNSURE**		**NO NOT AT ALL**
1.	She was very difficult to please.....	5	4	3	2	1
2.	She was concerned about my worries.....	5	4	3	2	1
3.	She was interested in how I did at school.	5	4	3	2	1
4.	She made me feel unwanted.....	5	4	3	2	1
5.	She tried to make me feel better when I was upset.....	5	4	3	2	1
6.	She was very critical of me.....	5	4	3	2	1
7.	She would leave me unsupervised before I was 10 years old.....	5	4	3	2	1
8.	She would usually have time to talk to me	5	4	3	2	1
9.	At times she made me feel I was a nuisance	5	4	3	2	1
10.	She often picked on me unfairly.....	5	4	3	2	1
11.	She was there if I needed her.....	5	4	3	2	1
12.	She was interested in who my friends were	5	4	3	2	1
13.	She was concerned about my whereabouts..	5	4	3	2	1
14.	She cared for me when I was ill.....	5	4	3	2	1
15.	She neglected my basic needs (e.g. food and clothes)	5	4	3	2	1
16.	She did not like me as much as my brothers and sisters..... (Leave blank if no siblings)	5	4	3	2	1

Do you want to add anything else about your mother?.....

3. AS YOU REMEMBER YOUR FATHER FIGURE IN YOUR FIRST 17 YEARS

Please circle the appropriate number. If you had more than one father figure, choose the one you were with longest, or the one you found the most difficult to live with. If you had no father in the household then leave out this section.

WHICH FATHER FIGURE ARE YOU DESCRIBING BELOW?

1. Birth father
2. Step-father/ mother's live-in partner
3. Other relative e.g. uncle, grandfather
4. Other non-relative e.g. foster father, adoptive father
5. Other (describe).....

(Neg/Ant)		YES DEFINITELY		UNSURE		NO NOT AT ALL
1.	He was very difficult to please.....	5	4	3	2	1
2.	He was concerned about my worries.....	5	4	3	2	1
3.	He was interested in how I did at school..	5	4	3	2	1
4.	He made me feel unwanted.....	5	4	3	2	1
5.	He tried to make me feel better when I was upset.....	5	4	3	2	1
6.	He was very critical of me.....	5	4	3	2	1
7.	He would leave me unsupervised before I was 10 years old.....	5	4	3	2	1
8.	He would usually have time to talk to me	5	4	3	2	1
9.	At times he made me feel I was a nuisance	5	4	3	2	1
10.	He often picked on me unfairly.....	5	4	3	2	1
11.	He was there if I needed him.....	5	4	3	2	1
12.	He was interested in who my friends were	5	4	3	2	1
13.	He was concerned about my whereabouts..	5	4	3	2	1
14.	He cared for me when I was ill.....	5	4	3	2	1
15.	He neglected my basic needs (e.g. food and clothes)	5	4	3	2	1
16.	He did not like me as much as my brothers and sisters..... (Leave blank if no siblings)	5	4	3	2	1

Do you want to add anything about your father?.....

4. **CLOSE RELATIONSHIPS IN CHILDHOOD**
(Please circle as appropriate)
(SUPP)
When you were a child or teenager, were there any **ADULTS** you could go to with your problems or to discuss your feelings? **YES/ NO**

IF YES: Who was that?
(Circle more than one if relevant)

1. Mother/ mother figure
2. Father/ father figure
3. Other relative
4. Family friend
5. Teacher, vicar, etc
6. Other (describe).....

Do you want to note anything about the relationship(s)?.....

Were there other **CHILDREN/TEENAGERS** your age that you could discuss your problems and feelings with? **YES/NO**

IF YES: Who was that?
(Circle more than one if relevant)

1. Sister
2. Brother
3. Other relative
4. Close friend
5. Other less close friend(s)
6. Other person (describe).....

Do you want to note anything about the relationship(s)?.....

Who would you describe as the **TWO CLOSEST** people to you as a child/teenager?
(Circle up to two)

1. Mother/ mother figure
2. Father/ father figure
3. Sister or brother
4. Other relative
5. Family friend (adult)
6. Friend your age
7. Other (describe).....

Do you want to note anything about the relationship(s)?.....

5. **PHYSICAL PUNISHMENT BEFORE AGE 17 BY PARENT FIGURE OR OTHER HOUSEHOLD MEMBER**

(Phyab)

When you were a child or teenager were you ever hit repeatedly with an implement (such as a belt or stick) or punched, kicked or burnt by someone in the household? **YES/ NO**

IF NO THEN SKIP TO 6 OVERLEAF:

IF 'YES'	**MOTHER FIGURE**	**FATHER FIGURE**
How old were you when it began?	**AGE**.....	**AGE**.....
Did the hitting happen on more than one occasion?	**YES/ NO**	**YES/ NO**
How were you hit?	**1.Belt or stick** **2.Punched/kicked** **3.Hit with hand** **4.Other**	**1.Belt or stick** **2.Punched/kicked** **3.Hit with hand** **4.Other**
Were you ever injured e.g. bruises, black eyes, broken limbs?	**YES/ NO**	**YES/ NO**
Was this person so angry they seemed out of control?	**YES/ NO**	**YES/ NO**

Can you describe these experiences?.....

Did you experience this from anyone else in the household? **YES/ NO**

IF YES: DESCRIBE BELOW

6. **UNWANTED SEXUAL EXPERIENCES BEFORE AGE 17**
(Please circle as appropriate)

When you were a child or teenager did you ever have any unwanted sexual experiences? **YES/ NO/ UNSURE**

Did anyone force you or persuade you have sexual intercourse against your wishes before age 17? **YES/ NO/ UNSURE**

Can you think of any upsetting sexual experiences before age 17 with a related adult or someone in authority e.g.teacher? **YES/ NO/ UNSURE**

IF NONE THEN SKIP TO END.

IF 'YES' OR 'UNSURE' TO ABOVE THEN COMPLETE THE FOLLOWING:

(Sxab)

	FIRST EXPERIENCE	**OTHER EXPERIENCE**
How old were you when it began?	**AGE** **.....**.....	**AGE** **.....**.....
Was the other person someone you knew?	**YES/ NO**	**YES/ NO**
Was the other person a relative?	**YES/ NO**	**YES/ NO**
Did the other person live in your household?	**YES/ NO**	**YES/ NO**
Did this person do it to you on more than one occasion?	**YES/ NO**	**YES/ NO**
Did it involve touching private parts of your body?	**YES/ NO**	**YES/ NO**
Did it involve touching private parts of the other persons body?	**YES/ NO**	**YES/ N**O
Did it involve sexual intercourse?	**YES/ NO**	**YES/ NO**

Can you describe these experiences?.....

THANK YOU!

Thank you for your help with this questionnaire. We realise that it is difficult to give a true picture of your true childhood experience in a questionnaire, so if you have any comments you would like to add, please write them below.

Your response will be treated in the strictest confidence.

Any other comments: